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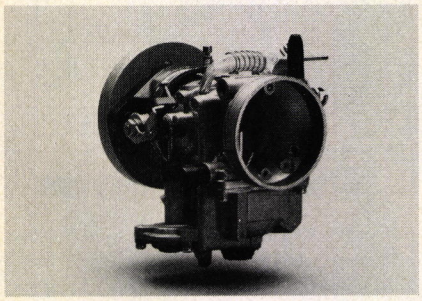

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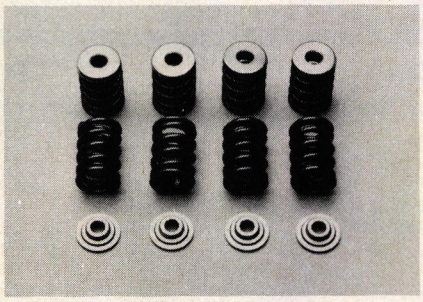

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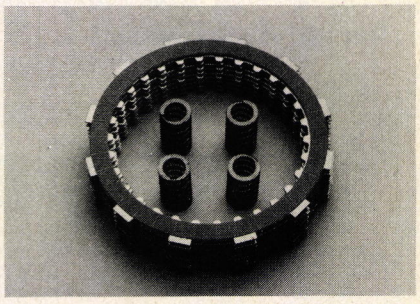

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OFF-ROAD

MAKE & MODEL	ISSUE	ENGINE TYPE	WHEEL TRAVEL, IN. FRONT/REAR	WEIGHT, LBS	HORSEPOWER @ RPM*		GEARS
Can-Am 250 MX-5	Jan. '79	Two-str.	10.8/10.0	218	32.1	8500	5
Can-Am 250 Qualifier III	Feb. '80	Two-str.	9.7/9.8	230	25.2	8000	6
Cam-Am 400 MX-6	June '80	Two-str.	11.5/10.8	233	38.3	6500	5
Honda CR125R	Jan. '80	Two-str.	11.5/10.8	202	20.8	10500	6
Honda CR250R	May '80	Two-str.	11.8/11.0	222	27.5	7000	5
Honda XL185	March '79	Four-str.	7.4/6.75	239	11.2	7500	5
Honda XR185	March '79	Four-str.	8.0/7.75	221	12.8	10000	6
Honda XR500	May '79	Four-str.	8.5/8.6	273	25.8	6500	5
Husqvarna 125CR-'80	Nov. '79	Two-str.	11.8/11.8	214	18.8	11000	6
Husqvarna 250CR	Dec. '78	Two-str.	11.8/11.8	227	24.3	8500	6
Husqvarna 250WR	Aug. '79	Two-str.	9.5/9.5	238	21.9	6500	6
Husqvarna 420AXC	Oct. '80	Two-str.	11.5/11.9	239	NA	NA	4
Kawasaki KLX250	Sept. '79	Four-str.	9.8/10.5	239	15.2	8500	5
Kawasaki KX125 A5	Oct. '79	Two-str.	9.8/10.0	194	20.0	11000	6
Kawasaki KX250	Sept. '80	Two-str.	11.3/11.2	233	26.8	8000	5
Kawasaki KX420	July '80	Two-str.	11.0/11.3	250	34.0	7000	5
Maico 400 MI	April '80	Two-str.	12.3/12.0	233	35.5	7000	5
Maico 450 MI	April '80	Two-str.	12.3/12.0	236	37.0	7000	5
Montesa Cappra 414 VE	Oct. '79	Two-str.	10.9/10.7	236	28.5	6500	4
Suzuki PE175	Aug. '78	Two-str.	8.8/9.4	216	11.2	9000	6
Suzuki PE400	Nov. '80	Two-str.	11.3/11.3	250	30.9	7000	5
Suzuki RM125T	Dec. '79	Two-str.	11.2/11.7	200	19.8	10500	6
Suzuki RM250N	May '79	Two-str.	11.2/11.8	218	27.1	8000	5
Suzuki RM400N	Sept. '79	Two-str.	11.2/11.8	229	28.1	7500	5
Kawasaki KDX175	Dec. '80	Two-str.	9.6/9.8	222	15.3	8500	6
Yamaha Pro-Tec 600	Nov. '79	Four-str.	10.5/10.1	262	46.2	6500	5
Yamaha IT250G	Dec. '79	Two-str.	9.8/9.8	244	27.7	8000	6
Yamaha TT250G	Aug. '80	Four-str.	8.8/7.5	242	17.7	8000	5
Yamaha YZ250G	March '80	Two-str.	11.2/11.6	217	29.6	8000	6
Yamaha YZ465G	July '80	Two-str.	11.2/11.8	228	39.4	7000	5

*Horsepower shown is taken at the rear wheel and does not account for transmission losses between the engine and rear wheel. These results may differ from manufacturer's claims or from results obtained using a different dynamometer.

STREET

MAKE & MODEL	ISSUE	ENGINE TYPE*	QUARTER-MILE, SEC./MPH	TOP SPEED, MPH	WEIGHT, LBS	FUEL CONSUMPTION, MPG	STOPPING DISTANCE FROM 60 MPH, FT.
BMW R100T (Dressed)	Aug. '79	2C/G	13.81/92.9	119	521	38-53	142
Ducati Darmah	Sept. '78	90-deg. 2D/F	13.41/97.5	118	487	25-40	120
Dunstall-Suzuki GS1000 CS	July '79	4A/F	11.32/117.0	154	488	37-.5	124
H-D CLE Sidecar	Sept. '79	45-deg. 2D/F	17.60/69.3	91	1036	25-35	181
H-D Tour Glide	Sept. '80	45-deg. 2D/F	15.58/83.9	108	785	35-44	223
Honda CB400T Hawk	March '80	2A/F	14.37/88.6	100	391	51-65	139
Honda CX500 Custom	Aug. '79	80-deg. 2E/G	14.12/92.9	102	468	44-51	146
Honda CB650	Feb. '79	4A/F	13.29/99.9	113	447	37-51	131
Honda CB650 Custom	Dec. '79	4A/F	13.10/99.8	113	447	44-52	131
Honda CB750F	Oct. '79	4A/F	12.41/106.8	128	524	31-52	135
Honda CB750C	Nov. '80	4A/F	12.68/105.3	128	530	39-46	131
Honda CB900C	June '80	4A/G	12.44/107.9	132	588	37-44	155
Honda Interstate	March '80	4C/G	13.40/96.0	121	718	33-45	146
Honda CBX	Dec. '79	6A/F	11.86/114.5	130	555	19-36	145
Kawasaki KZ550	Sept. '80	4A/F	13.45/97.1	103	426	37-51	150
Kawasaki KZ650 Custom	May '79	4A/F	13.16/100.2	116	483	45-49	125
Kawasaki KZ750	May '80	4A/F	12.50/107.8	127	471	39-50	134
Kawasaki KZ1000	Aug. '80	4A/F	12.12/111.1	130	548	37-45	131
Kawasaki KZ1000 Shaft	Aug. '80	4A/G	12.19/112.2	132	582	32-44	129
Kawasaki Z1-R	April '80	4A/F	12.24/110.6	130	552	35-48	131
Kawasaki KZ1300A GT	Sept. '80	6A/G	12.71/107.4	135	730	31-45	146
Laverda 1200 Jota	Dec. '78	3A/F	12.54/105.0	121	518	29-37	145
R.C. Turbo CB750F	Oct. '80	4A/F	11.99/113.8	NA	523	27-39	135
Suzuki GS450 ST	May '80	2A/F	14.09/92.5	100	397	55-57	127
Suzuki GS750ET	July '80	4A/F	12.62/105.5	122	523	39-55	130
Suzuki GS850N	March '79	4A/G	12.81/104.0	116	566	35-45	153
Suzuki GS1000E	Aug. '80	4A/F	11.98/113.9	136	528	32-50	137
Suzuki GS1000G	Aug. '80	4A/G	12.34/110.8	139	564	30-51	141
Suzuki GS1100ET	April '80	4A/F	11.43/118.3	140	544	37-49	116
Triumph Bonneville Special	July '79	2A/F	13.94/96.2	110	411	45-55	175
Yamaha RD400F	June '79	Two-str. 2A/F	14.16/90.2	98	355	30-43	129
Yamaha RD350LC	Dec. '80	Two-str. 2/AF	5.5/3.8	113	328	NA	126
Yamaha XJ650 Maxim I	June '80	4A/G	12.60/107.4	120	453	40-54	128
Yamaha XJ650	Nov. '80	4A/G	13.19/102.4	125	476	43-44	NA
Yamaha TZ750E	April '79	Two-str. 4A/F	11.62/125.5	180	331	NA	NA
Yamaha XS850LG	Feb. '80	3A/G	13.10/101.7	116	548	42-55	144
Yamaha XS1100SG	Jan. '80	4A/G	11.94/112.6	135	572	42-47	129

*A-Transverse Vertical, B-Vertical, (single-cylinder only), C-Horizontally Opposed, D-Tandem Vee, E-Transverse Vee, /F-Chain Final Drive, /G-Shaft Final Drive, /H-Belt Final Drive

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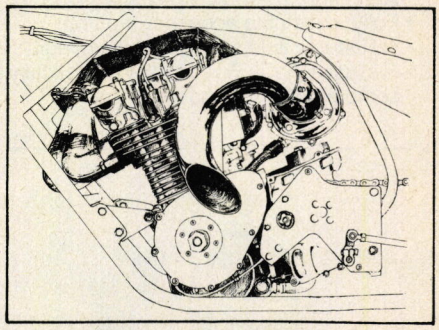

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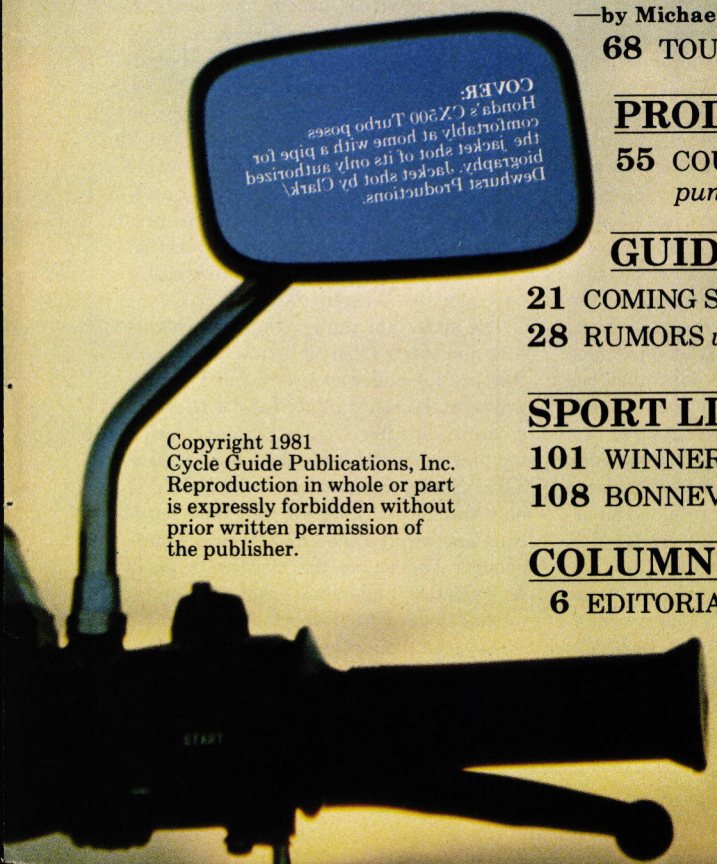
COVER:
Honda's CX500 Turbo poses comfortably at home with a pipe for the jacket shot of its only authorized biography. Jacket shot by Clark/Dewhurst Productions.

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Editorial

The Death of Roadracing

A little hand-wringing music, please

• Roadracing's death will be announced shortly. It happens every winter. Once the champions are decided, the prize money awarded and the profit and loss statements totaled, the health of racing becomes fodder for many long and boring conversations. And it's usually discussed in the same tone reserved for the health of some rich uncle who threatens to kick off and thus end the family gravy train.

I duck these conversations and the furrowed brows that result as often as possible. I can't endure racers mewling about the size of entry fees, promoters whining about the size of the gate and team owners bleating that larger sponsors are required. A certain myopia dominates their comments, for they believe that racing should be subsidized, that someone else should pay for their fun. And so roadracers regularly promise that just one more injection of cold cash—racing's life's blood—and racing can once again be prevented from teetering over the brink into bankruptcy.

This perspective suggests that racing's fundamental problems can be solved by a few fat cats willing to pick up the tab. I can't subscribe to that viewpoint. I have my own panacea for insuring the long-term health of roadracing—more spectators. You see, there's always been a lot of fat cats in racing. The trouble is, they quickly tire of throwing their money in the street. No matter how flimsy advertising budgets (the usual source of sponsorship money) might appear, the money must at least seem to be spent wisely. And that means giving the fat cats what they pay for—people at the racetrack. Asking for subsidies just because roadracing is a fine thing to do is fruitless.

The Champion Spark Plug Classic at Laguna Seca Raceway in Monterey, California this past summer provided a handbook on how to get people to watch roadracing—something they've been doing in declining quantities. Most of the secret lies in transforming just another race day into an Event, much as Daytona attempts to do. A spectacle worthy of notice has far more impact on a successful race than discussions of the rulebook. And spectacle depends upon the attractiveness of the facility and its philosophy of racing.

To begin with, Laguna Seca has become one of the foremost spectator tracks in America—in the same league with Lime Rock, Mid-Ohio and Elkhart Lake—because of more than the asphalt which loops over the countryside. Laguna certainly furnishes plenty of challenge in this regard, but for the spectator more is at stake than the track's degree of difficulty. For him, Laguna is especially good because so many viewpoints offer an unobstructed look at two-thirds of the racetrack at once, which helps you understand the race as it unfolds. Furthermore, Laguna Seca goes to great lengths to supply lots of commentary to make the race more interesting for the average spectator. While the commentary could be improved, its presence and the fact that it can be heard everywhere makes racing far more accessible to people who don't read *Cycle News* every week.

Laguna Seca's convenience facilities also bolster its reputation. Permanent snack bars, outdoor barbecues, flush toilets and even camping facilities pamper the race-watcher. After all, you can take just so much dust and so many outhouses during a weekend before the fun goes out of racing completely—as any visitor to Laguna Seca ten years ago could tell you. In many ways, Laguna's paved access roads, large paddock area, grandstands and the pond that has taken the place of the dusty lake bed make you feel as if you're at a park instead of a racetrack. Laguna Seca isn't just some Spartan sandlot where you can see some racing; it's a pleasant place to spend an afternoon in the outdoors.

Clearly the acknowledgement that the roadracing spectator is human has done much to transform Laguna's facilities in recent years. Even more important, though, is the management's allegiance to Event-think. Laguna isn't a place you visit on impulse. Instead, you make a pilgrimage. Long ago, the track's management realized that saturating the public with speed events would lead to ruin. So the only races held at Laguna are prestige events, so you anticipate the weekend for months beforehand and relish it for months afterward.

These are the kind of strategies that have created a loyal following for Laguna's yearly motorcycle event. And so attendance this summer set new records despite the lack of international riders that Daytona touts as the source of its appeal. Laguna Seca gets people to the racetrack because something special happens there. And also because the physical hardships aren't so intense that spectators are restricted to aficionados. Laguna's management understands that the ordinary individual's thirst for speed and spectacle must be supplemented by ordinary creature comforts, just like at a stadiumcross or flattrack. Race spectators are no different from the people who attend football games, really. The atmosphere of the event attracts them just as powerfully as the competition. That's why football stadiums sell out when you can get your fill of football far more easily at home in front of the television set.

Curiously, it's this aspect of motorcycle roadracing that should make its future bright, no matter what the whiners say. Outdoor recreation close to metropolitan areas will soon be at a premium, futurists say, so spectacles like racing have the potential for large-scale attendance figures. And as the price of other advertising media increases, the fat cats are bound to look with favor upon large numbers of people corralled in one place on a Sunday afternoon. And Laguna Seca's success in presenting roadracing to the public proves that these factors already can be put to work for pavement-scratchers.

The important thing is that the whiners misunderstand racing's foundations when they cry for larger sponsorships. The only way to make racing more viable is to create environments like Laguna Seca and seek a long-term constituency for speed events. The fat cats won't support the habits of only the hard-core racers and their hard-core fans because the numbers aren't large enough. The sooner the mewlers, whiners and bleaters understand that the fundamental issue is more spectators, not more money, the sooner the annual hand-wringing about the health of motorcycle roadracing can be dispensed with.

—Michael Jordan

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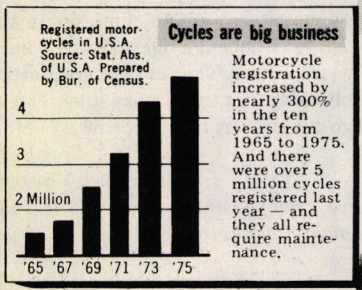
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Motorcycle Shops Employ Qualified Mechanics. Has your bike ever been out of action waiting for needed repairs? Some shops don't have enough mechanics to take care of everyone as fast as they like.

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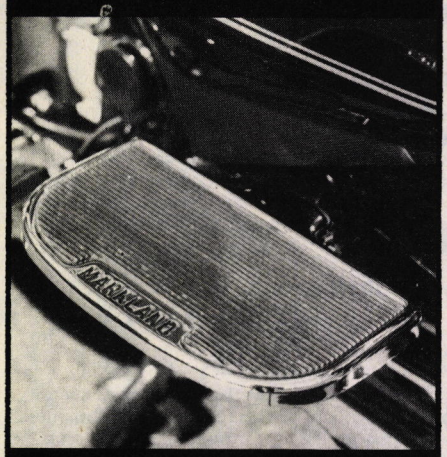
MARKLAND INTRODUCES NEW

Footboards

FOR RIDER AND PASSENGER



Patent pending design features 12 ga. footboards, new style non shrink rubber mats and mirror chrome finish.

Passenger footboard installs on the stock footpeg clevis using a unique attaching device that allows you to; (1) Retain the footpeg stop, (2) Adjust the footboard tilt for maximum passenger comfort, and (3) Tilt up the footboard for centerstand access without hitting the sidecover. One kit fits most bikes including BMW, Harley, Honda, Honda Interstate, Kawasaki, Suzuki and Yamaha.

New style driver footboards come in all kits. They may be purchased separately and will fit all early Markland Kits which had aluminum foot rests.

Some customers who purchased driver footboard kits with aluminum boards received mats which were defective. We apologize. Please contact your dealer or the factory and new mats will be sent free of charge.

Coming up next:

Gold Wing/Interstate compatable ride off stand, engine guard and driver footboards.

For more information contact your local dealer or:

MARKLAND INDUSTRIES
1501 E. McFadden Ave.
Santa Ana, California 92705

Letters

British Winners, Japanese Losers, Eurobike Bits and Pieces

TRUMPETING TRIUMPHS

You guys are amazing. Every month you find a bike that has low weight, high horsepower, excellent handling and is so comfortable that you can fall asleep on it. I have toured and raced on both sides of The Pond and have found only one bike that comes close to what I want. It has 750cc, an honest wet weight under 500 lbs, a quarter-mile time in the 12's, rock-steady handling *and* it doesn't sound like a 12-speed blender on a wind chime. I have an early model Trident. In fact, I have two of 'em. Too bad they don't make any more of them. God Bless the Queen.

Craig Skinner
Tempe, Arizona

Applications for Knighthood are taken at Buckingham Palace, not here—ed.

ONE MAN'S OPINION

In November's issue reader Dr. Guido Sutter reports that he bought a CB400F after reading your test on the Kawasaki KZ550. Poor boy. *I* just traded my 400 Four in on a KZ550, and I must say that the Kawasaki is superior in every way. My new bike gets better mileage, is infinitely faster and goes around corners with more stability than the top-heavy Honda. Just think: over 50 mpg, faster (quarter-mile) than a Turbo Porsche and a price tag just over two grand. Now *That's* Incredible.

William A. Dunlap
Huntington Beach, California

Yeah, but does it sound like a blender on a wind chime?—ed.

DEALERSPEAK

I am writing in response to your test of the XJ650 Euro model. If you need petitions or signatures to help sell your stand on the Euro XJ, we would be more than willing to help here at our dealership.

I have been following *all* the written material concerning the pros and cons of the "Special" bikes currently being produced. I agree with all of the testers' comments in every way but one: sales. Those sit-low pullback bars, fat rear tires, teardrop tanks, and leading-axle front ends sell like hotcakes.

We will probably sell the XJ Euro on a one-to-five or a one-to-six basis compared to the U.S. version (Maxim), but believe me, I want the chance to sell that one.

George F. Smith
Flemington Cycle Shop
Flemington, New Jersey

SALESTALK

I'm an Assistant Sales Manager at Shawmut Hills Honda/Yamaha. My purpose in writing is YES we need the Yamaha XJ650 Eurobike in the States. Many of my customers wish they could buy one. I wish I could sell them some!

Kim P. Price
Grand Rapids, Michigan

EUROBIKE BITS

I just read the November issue, and you can count me in. I'm willing to stand up on an XJ650 Eurobike crate. Where do I get in line to buy one?

James Kamanski
Milwaukee, Wisconsin

You can keep the crate. We'll take the bike—ed.

I very definitely want to climb up on your soapbox, and I hope it's right outside Yamaha U.S.A.'s front door. Thanks for a great article. The only thing that could make it better is if I could go out and buy one tomorrow.

Greg Bersie
Green Bay, Wisconsin

Well, we'll sell you another copy of the article if it'll make you happy—ed.

Already plans are being formed in my head as to how one of these Yamaha Euro-650's can be smuggled into this country . . .

Daryl Swenson
St. Cloud, Minnesota

It's the right bike for anytime! I personally *lust* for the Yamaha XJ650, and would gladly put up considerable front money if we could persuade Yamaha to import this bike . . .

John Shepherd
West Palm Beach, Florida

Add my name to the list of those who lust after the Eurobike Yamaha 650 . . .

Doug Boyer
San Diego, California

Hell yes! I would buy a Yamaha XJ650 today, if only I could . . .

Ed White, Jr.
Long Beach, California

I have only one thing to say about the XJ650. I want one.

Tim Kitzmiller
Tempe, Arizona

If the Yamaha XJ650 Eurobike is half as good as your evaluation, I'm a buyer! P.S. They ought to drill the discs, hide the horns and put a competitive price tag on it—in U.S. dollars!

Victor F. Calderon
Sarasota, Florida

I hate Disco, I hate Disco Bikes. Give me Rock 'n Roll and an XJ650 Euro and I'll be at the beach faster than you can read this letter!

John Walaszek
Old Bridge, New Jersey

We read this letter at the beach, waiting for our XJ650 ship to come in. Where were you?—ed.

This could be my excuse to go see Europe . . .

Doug McCadam
Vail, Colorado

THERE'S ALWAYS A FLIP SIDE

I have just finished reading the article in your November issue concerning the XJ650 Eurobike. I am presently the proud owner of a Maxim and feel it is one of, if not the best, American-sold bikes Yamaha has ever made!

Seven other Yamaha models have been in my garage over the past few years, and I must say the Maxim fits my five-foot-six-inch frame the best. I have found that with some suspension changes the Maxim is a much better back-roader than it is stock. I use my Maxim to go everywhere. This summer I took a couple of 300 to 400 mile trips and found the bike more comfortable than most people find it. I guess my height helps. It seems to be built for us shorter people.

D.J. Haldeman
Manheim, Pennsylvania

EUROBIKE PIECES

Gentlemen, let me state my feelings as coolly and logically as possible. I want. I Want! I WANT!!

Pant, drool, whine, whimper, shake, sniffle, not to mention a ten pound loss of water weight caused by torrential downpours of tears. Tears of joy, tears of longing! Seeing that bike and living, breathing every eloquent word Messrs. Thompson and Jordan so graciously conveyed to your reading public, I felt I had lost my virginity once again.

David A. Phillips
Great Falls, Montana

You mean you've lost your virginity more than once?—ed.

I have just finished reading your comments regarding the Yamaha Euro-XJ650. Perhaps it is time to take the Yamaha marketing man to lunch. Or promise that you'll leave his wife alone. Or exert any other influence you may have to, at least, get this model test-marketed in the U.S. Tell the man you have found yet another sincere customer. And this one has a trade-in.

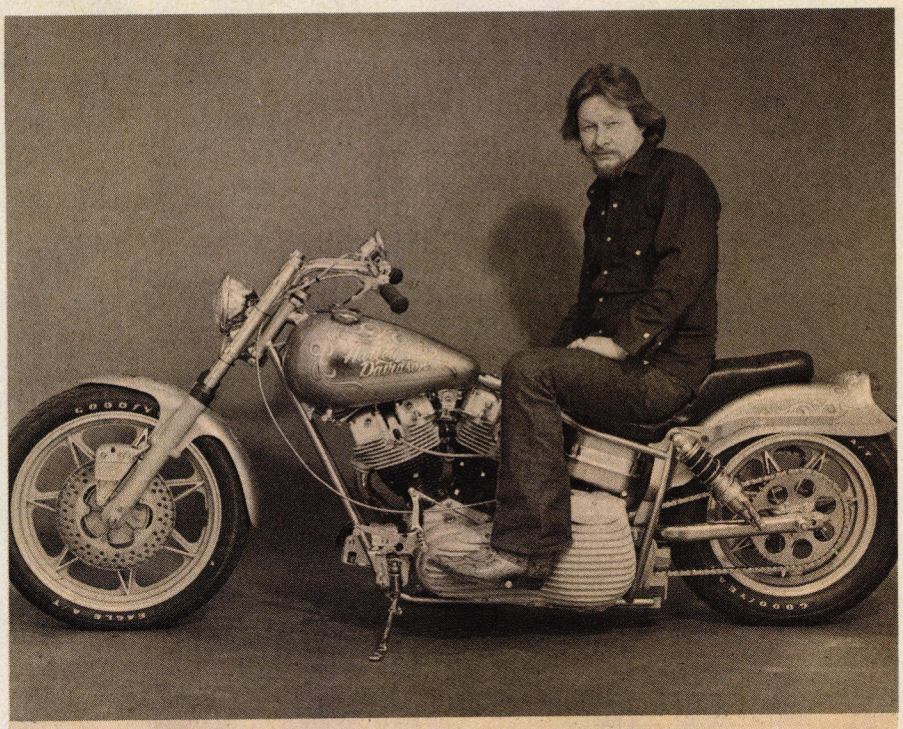
Doug Wilson
Camas, Washington

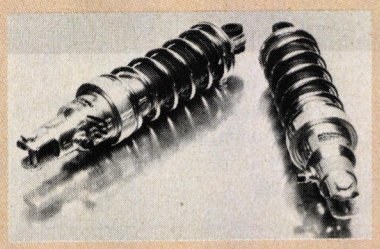
We're trading in his wife. What have you got?—ed.

Okay guys. I fell for my '79 Suzuki GS1000S because of your editorial enthusiasm in the July '79 issue. Then I read all the ranting and raving in September '80 about what I was missing by not coming to my senses and going out to latch onto a Kawasaki 550. *Now* you come out with your test on the "Euro-bike Yamaha," trying your best to convince me to move out of the country! What the heck is this, a conspiracy? Is my personality *really* that bad, or does Dewhurst know some gorgeous, rich British lady who's heard about me?

Michael VonFroats
Chanassen, Minnesota

If Dewhurst knew a gorgeous, rich lady in England, he wouldn't be in California—ed. ●





AVERAGE?

Bad guess. That's Arlen Ness, and when it comes to custom motorcycles he's about as far from average as they come.

When Arlen builds a custom bike like his "Silver on Silver" here, only the best is good enough. He is not a mainstream man and, for his bikes, mainstream parts just won't do.

Which is why he uses Mulholland Force 1 shocks by Interpart. Exclusively. When Arlen builds a showpiece bike like this, he knows Force 1 offers the looks and performance for that special finishing touch.

He also knows Force 1 shocks work as well on the open road as they do under the spotlights. The nitrogen gas charged shocks absorbers perform under all riding conditions. The tunable, progressive rate air spring lets you tailor the ride the way you like. A steel coil spring allows us to incorporate a low air pressure system for a softer, more comfortable ride. And an impact extruded aluminum shock body is tough enough to keep on performing under extreme conditions.

So whether you build custom bikes like Arlen Ness, or are more interested in hard riding across the country, you'll stay ahead of the crowd with Mulholland Force 1 shocks. ***The above shocks for the above average rider.***

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Mulholland

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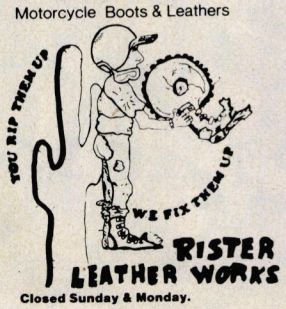

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Patches	4.00 and up

10% OFF WITH THIS AD.

Include Name, Address, Phone #, and complete description of all work to be done.
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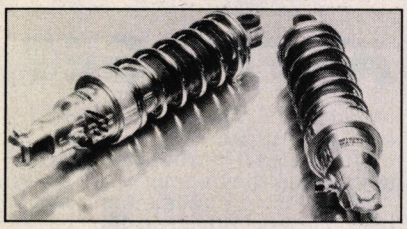
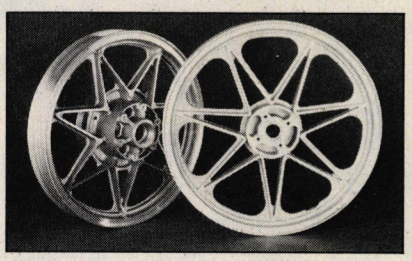
Motomart

Buyer's guide for the cycle guy

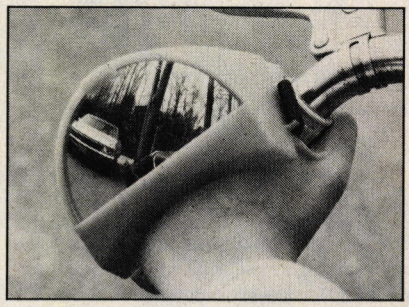
Super Shocks For Superbikes: Superbike riders need good suspension just like everyone else. To aid in that end—preferably a softer end—is Interpart's Mulholland Force 1 Airshock. It combines a nitrogen gas charged shock, a progressive tuneable air spring and a steel coil spring that allows for a low-pressure damping system and increased tuning potential. The Force 1 Airshock is constructed of impact extruded aluminum alloy and the damping mechanism is claimed to provide consistent, smooth action while requiring no adjustments. You'll find Mulholland Force 1 shocks at most dealers, but if you don't, contact Interpart at 230 W. Rosecrans Avenue, Dept. CG, Gardena, California 90248. Or call (213)538-9820.

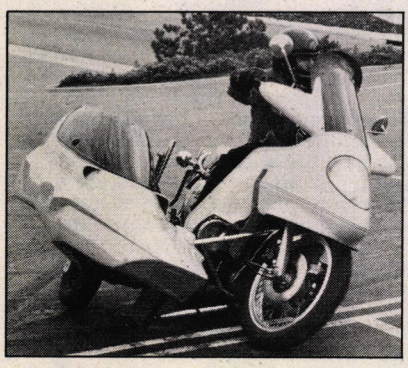




No More Spokes: Let's hope that the next time you see stars from riding your motorcycle they're from Racecrafters' Seven-Stars wheels and not because you're lying face-down on the pavement. These all-aluminum bolt-on mag-types offer increased strength and are claimed to eliminate truing problems inherent in spoked wheels. Seven-Stars can be installed on your Honda, Kawasaki or Suzuki motorcycle. And you can thank your lucky stars if you have tube-type tires because these wheels won't fit on the tubeless variety. For more information contact Racecrafters Inc. at 7801 Canoga Avenue, Dept. CG, Canoga Park, California 91304. Or call (800) 423-5120.

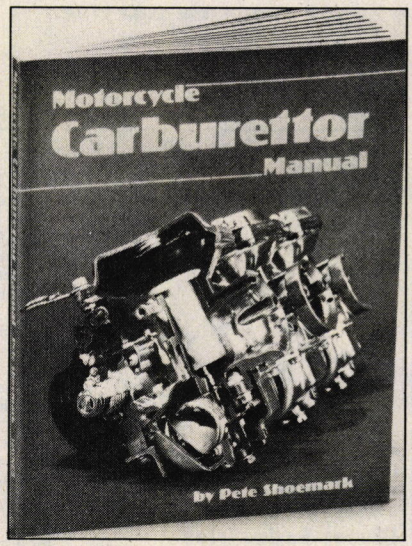
Bakvu Wrist Mirror: Another cure for the *fuzzies* doesn't involve eyes in the back of your head but rather eyes in the back of your hand. Bakvu, a wide-angle wrist mirror from Pokorny Sales and Manufacturing, fits a gloved or bare hand and fastens with an adjustable Velcro strap. The manufacturer claims the wide-angle mirror and its housing are lightweight and scratch-resistant; suggested retail price is $6.95. If you'd really like to take a look at where you've been, contact Pokorny Sales and Manufacturing at Tierney Road, Dept. CG, Lake Hopatcong, New Jersey 07849. Or call (201) 663-4040.

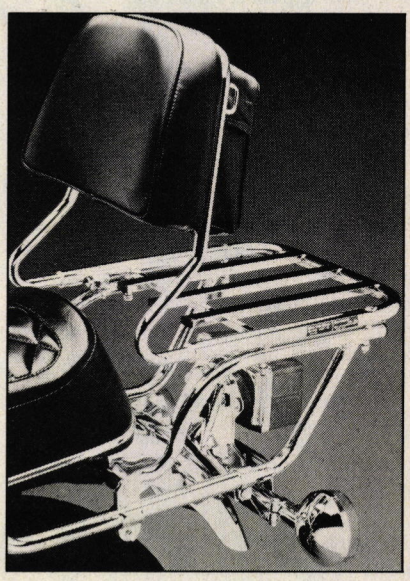




Equalean Sidecar: Many motorcyclists toy with the thought of bolting on a sidecar. But usually visions of poor handling and perpetually upright riding keep these thoughts from becoming reality. Could be that all this has changed through the offices of the Equalean sidecar. By tilting left and right in harmony with the motorcycle, the Equalean allows the rider to ride more or less as if he were *sans* sidecar. Mounting hardware for the Equalean is designed for stock motorcycles 500cc and larger. This 200-lb. sidecar comes with a steel chassis and black, carpeted interior. A lockable canopy that converts to a windshield when in use is optional. For more information, lean on the folks at Equalean Sidecar Co., 6141 W. Orange Avenue, N. 32, Dept. CG, Cypress, California 90630. Or call (714) 827-8587.

Carburetor Compendium: If your bike has problems with fuel/air mixing, or if you just want to learn more about carburetors, Haynes has a book for you. For $8.50 you can get a copy of *Motorcycle Carburetor Manual*, which could lead you to a better understanding of your carb. Chapters deal with three major types of carburetors: slide, constant depression and fixed jet. Further chapters relate to overhaul, specific variations from common designs and tuning aids and equipment. Get your copy at dealerships and accessory outlets.





Hondaline Luggage Rack: Packrats will be happy to hear about Hondaline's luggage racks, designed to fit all Honda motorcycles from the CM200 to the GL1100. Each rack is engineered for a precise attachment to an individual model, so you shouldn't need a master mechanic to install the unit. You'll find these luggage racks at Honda dealers across the country, with prices starting at $26.95. The matching adjustable backrest sells for $38.95; it comes with a contoured padding and zippered pouch.

IF YOU GOT BEATEN BY A YZ LAST YEAR HERE COMES MORE BAD NEWS.

The bad news is, the 1981 YZ's are even more awesome than the ones you couldn't catch last year.

The good news is, you can buy one.

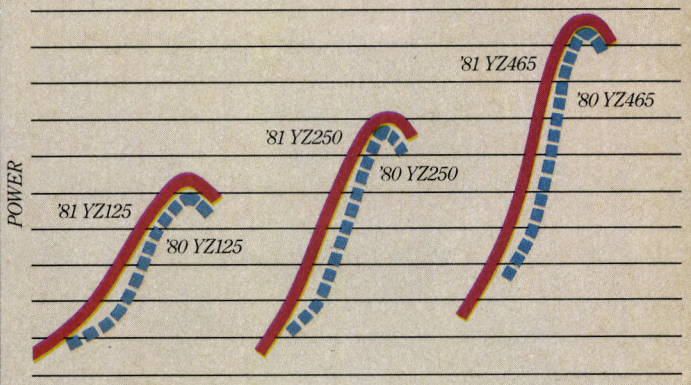
And reverse the trend.

This year, we made every one of our big machines more powerful than ever before. Not just the wide-open, flat-out variety, but a steady stream of *useable* power through out the rpm range.

No simple task, especially when you consider that we had to literally re-engineer each engine according to its size and performance characteristics.

There was no one formula. But a unique combination of ingredients to make them go fast, fast, fast.

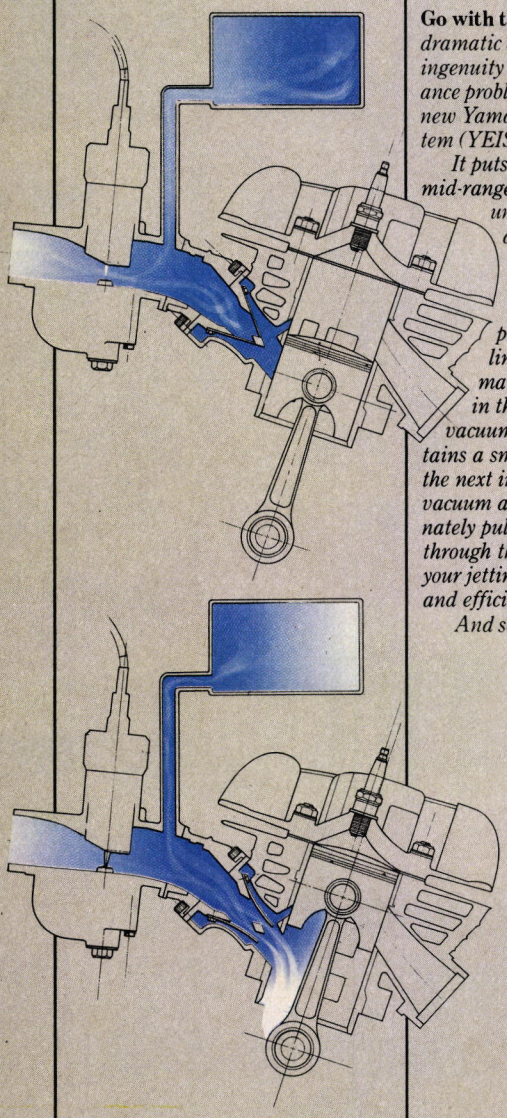
Graphic proof. *The results of all our power-boosting engineering efforts are reflected in the horsepower curves on this graph — 1980 vs. 1981. Looks like 1981 is going to be a very good year.*



Good timing. *A millimeter or two in port timing — both size and placement — can result in a real performance increase.*

For 1981, we've significantly improved both the intake and exhaust port timing on each of our big YZ's. And on the 125 specifically, the exhaust port has been moved from 30% off-center to the centerline position for a smoother exhaust flow.

In addition, all three YZ's sport a completely redesigned exhaust pipe for increased flow and maximum efficiency.

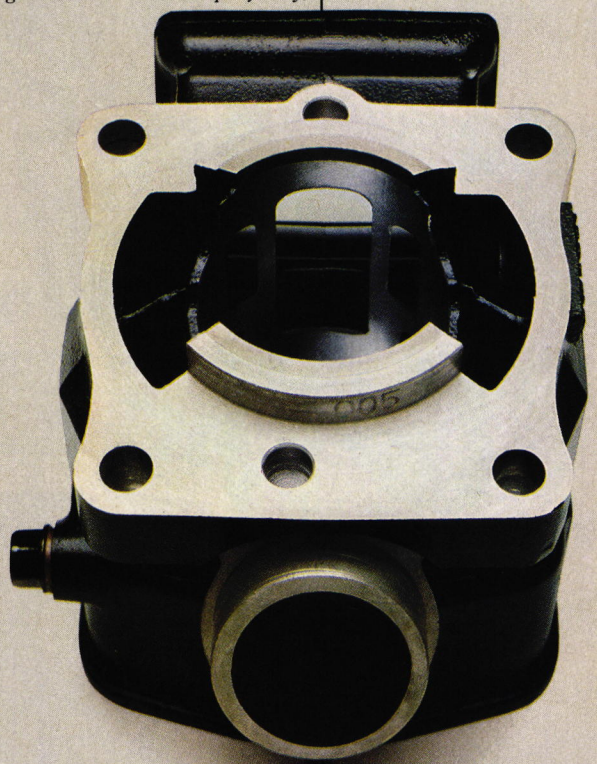


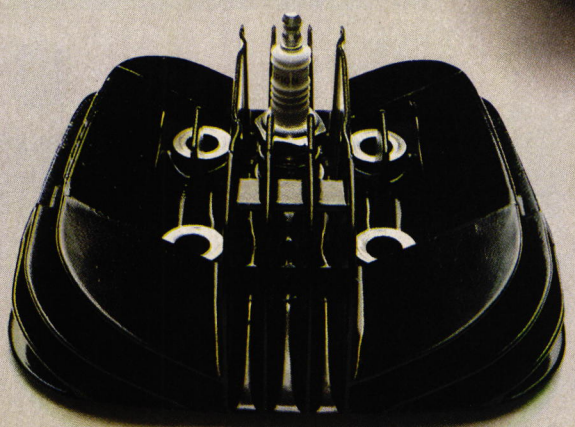
Go with the flow. *Perhaps the most dramatic example of Yamaha ingenuity solving a specific performance problem is our revolutionary new Yamaha Energy Induction System (YEIS for short) on the YZ250.*

It puts an end to the low and mid-range power drop caused by the uneven, pulsing flow of the air/fuel mixture, and the resulting need to compromise carburetor jetting.

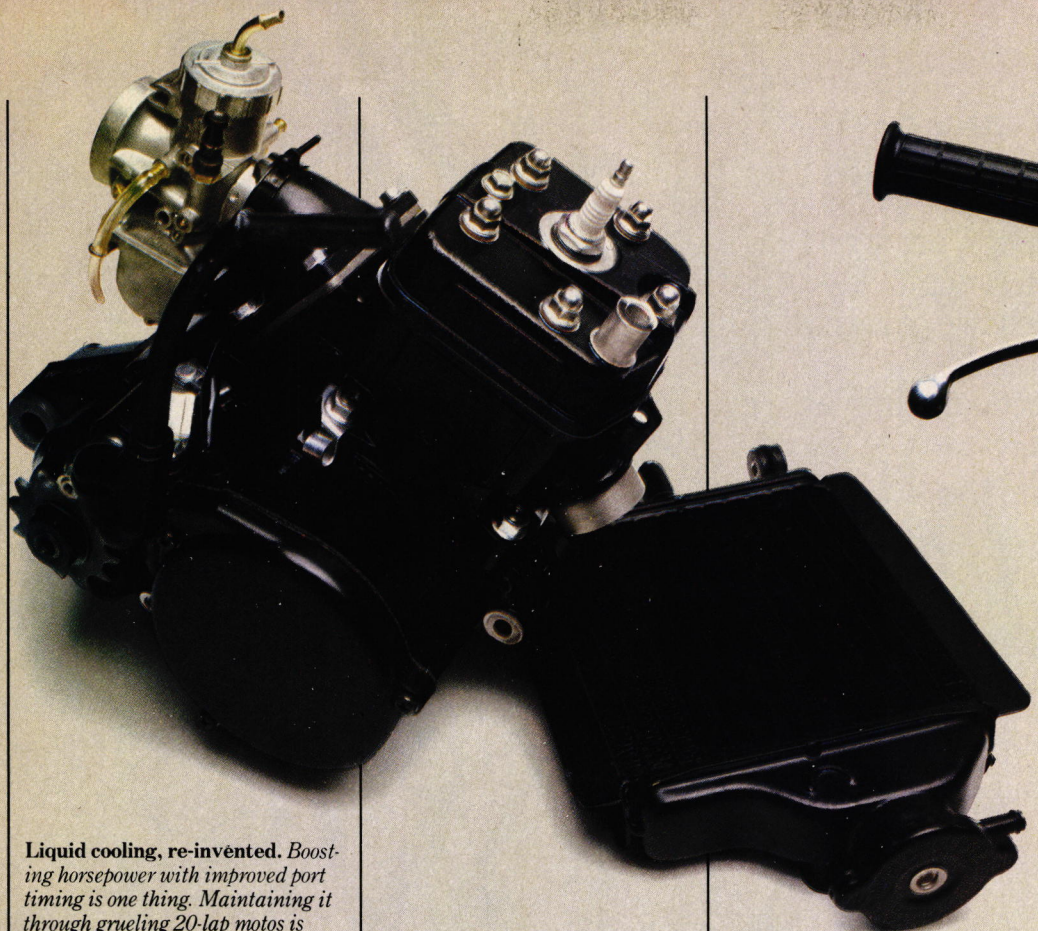
YEIS has no moving parts. Just a small chamber linked by a hose to the intake manifold. A vacuum created in the chamber by crankcase vacuum on the intake stroke maintains a smooth air/fuel flow until the next intake stroke. With engine vacuum and chamber vacuum alternately pulling this steady flow through the carburetor, you can set your jetting for maximum power and efficiency.

And set your sights on winning.





Even our minis give you more. Enclosed in their newly-designed, lightweight chrome-moly frames, the YZ60 and 80 engines sport totally new cylinder designs with larger transfer ports, larger reeds, and radial cooling fins just like the big bikes. Power to the little people!



Liquid cooling, re-invented. *Boosting horsepower with improved port timing is one thing. Maintaining it through grueling 20-lap motos is quite another for small-bore air-cooled engines.*

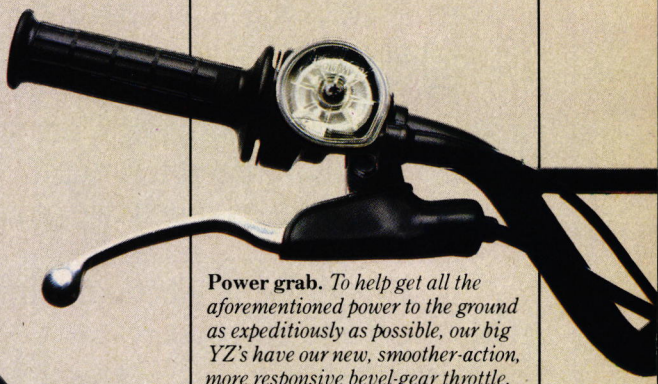
Our solution for the YZ125: liquid cooling.

Of course, being Yamaha, we didn't just slap on any old liquid cooling system. We were ready with a truly innovative system proven over five years on our own OW works machines.

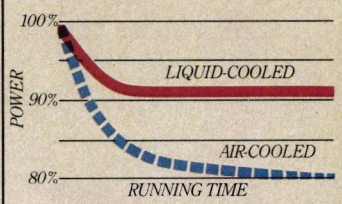
Our system not only allows higher peak horsepower tuning and maintains more of that power longer, but does it with less external bulk and less effect on handling than any other liquid cooled MX'er in the dirt.

The key to this accomplishment lies in how the coolant is delivered to and recovered from the engine: through the steering head, triple clamp and downtube of the bike itself!

As you can see in the cutaway illustration.



Power grab. *To help get all the aforementioned power to the ground as expeditiously as possible, our big YZ's have our new, smoother-action, more responsive bevel-gear throttle.*



Long life line. *This chart plots the percentage of peak horsepower maintained through the course of a race by our liquid-cooled 125 versus an air-cooled design. Impressive, no?*

The coolant flows through a series of ingeniously-engineered seals, from the radiator into the bottom of the steering stem, through the steering head, into the frame downtube, through the pump to the cooling jackets in the cylinder and head. And back again.

To make sure you finish the race with as much radiator as you started with, it's mounted behind a special protective number-plate cowl in front of the triple clamp. This is also the best position for maximum airflow.

There are no long, bulky hoses to twist or chafe between frame and steering system, or to snag on obstacles. Just two short pieces of hose between engine and frame.

The coolant pump is out of the way, inside the left crankcase cover. At 10,000 rpm, pump volume is in the neighborhood of 21 liters per minute, which means the coolant is completely recycled in less than 3 seconds.

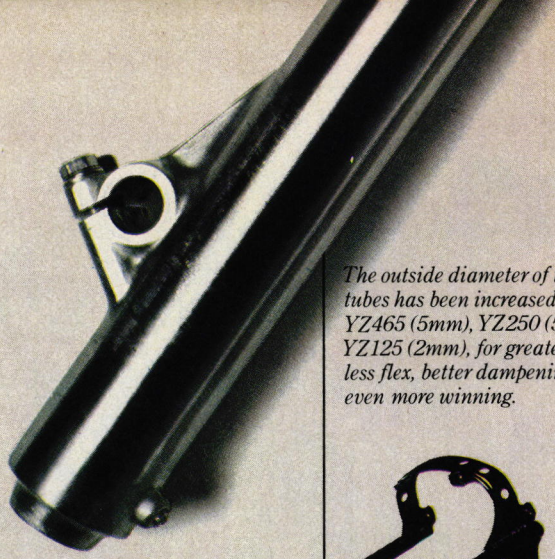
Engine parts that run cooler last longer.

So what else is new on the new YZ's? What isn't?

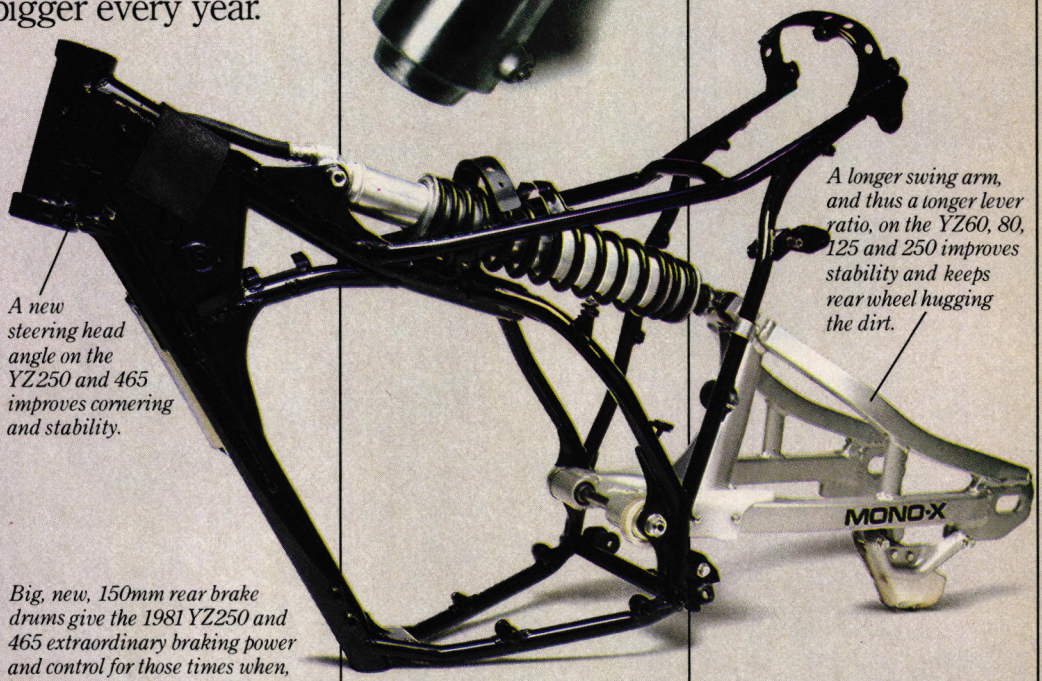
From rear Monoshocks to rear brakes, from fork tubes to foot pegs, our 1981 full-size MX'ers have been thoroughly re-thought to make as much use of their new-found power as possible.

And we didn't neglect our minis, either. Our YZ60 and 80 get bigger every year. In performance, if not in size.

Across the board, the 1981 YZ's are designed to take the holeshot. And go on for the whole shot.



The outside diameter of the fork tubes has been increased on the YZ465 (5mm), YZ250 (5mm) and YZ125 (2mm), for greater stability, less flex, better dampening and even more winning.

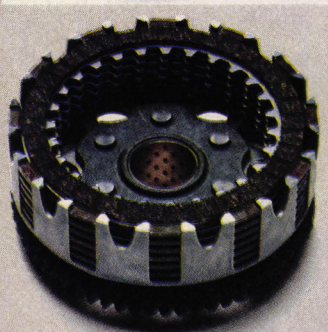


A new steering head angle on the YZ250 and 465 improves cornering and stability.

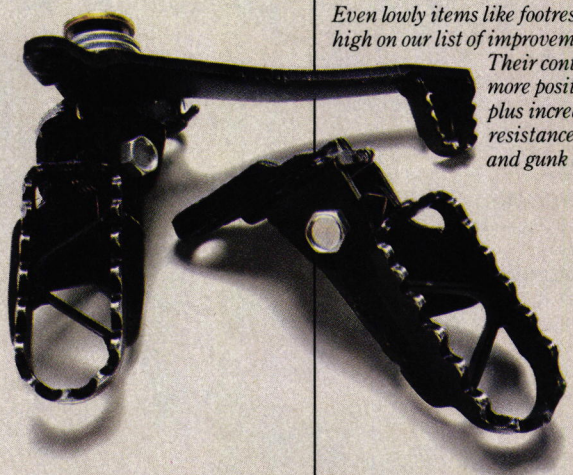
A longer swing arm, and thus a longer lever ratio, on the YZ60, 80, 125 and 250 improves stability and keeps rear wheel hugging the dirt.

Big, new, 150mm rear brake drums give the 1981 YZ250 and 465 extraordinary braking power and control for those times when, like it or not, you have to slow down.

The front brake shoe shaft on the YZ125 now features an eccentric cam, like the YZ250, for a dramatic increase in braking pressure, leverage and power.



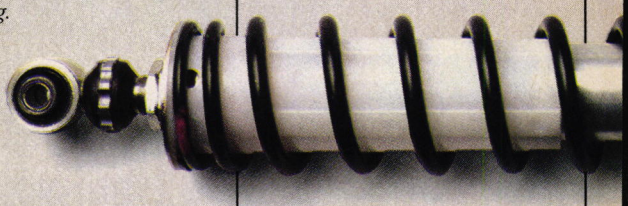
The new, improved clutches on the YZ125 and 250 are stronger and more reliable.



Even lowly items like footrests are high on our list of improvements. Their contribution: more positive grip, plus increased resistance to mud and gunk and such.

There are three reasons for the unique and very effective new tread design on the YZ knobbies: blasting the berms, whipping the whoop-de-doos, and streaking the straights.

The YZ250 and 465 Monoshocks offer more dampening adjustment stages (from 18 to 24) for even finer fine tuning.



This year, the YZ80 Monoshock takes after its big brothers with a remote reservoir for more efficient cooling. And a brand-new progressive-rate spring for better control.

This year, our works-type spring loaded shift pedal is standard on all three big YZ's. So you can lay it into the turns, confident of coming out with the pedal intact.

When you roll your new YZ out the door, it's not goodbye. To see what we mean, just turn the page.

WITH EVERY YZ YOU BUY YOU GET A FREE FACTORY.

When you buy a Yamaha, you not only buy the state-of-the- art engineering that made us number one, but also the day-to-day know-how that keeps us there.

Our Competition Support Program makes the nuts and bolts of our technical expertise easily accessible to you.

We'll share team secrets.
At many dealers, you can step up to our Team Yamaha Center and get up-to-the-minute, detailed information about outfitting and fine-tuning your bike for competition.

In our Competition Wrench Reports, for example, you'll learn our very latest discoveries in adjusting and modifying your racing machinery. Everything from how to get the most out of your Monoshock suspension system to tips on what kind of tire Brock Glover prefers on what kind of track.

And to keep you posted on the national standings, your dealer will receive Yamaha race result mailgrams on a regular basis.

Yamaha's dial-a-wrench.
When you find yourself elbow-deep in grease and not quite sure what the next step should be, wipe off one hand and reach for the phone.

One call to your nearest Team Yamaha Center will put you in touch with some fast answers.

Each Team Yamaha Center has a direct line to Yamaha's Engineering department. Your dealer can call and get the information you need. When you need it.

Portions of the Yamaha Competition Wrench Reports will be printed periodically in Cycle News. So if you happen to miss one at your dealer, you're still in luck.

Yamaha gets behind you.
These are just some of the ways we support our YZ riders throughout the season.

As the winningest motorcycle manufacturer in the world, we realize that there's a lot more to competition than the glory of the winner's circle. There's the everyday down-and-dirty work that gets you there.

At Yamaha, we're convinced that the best way to keep you out in front is to stand behind you.

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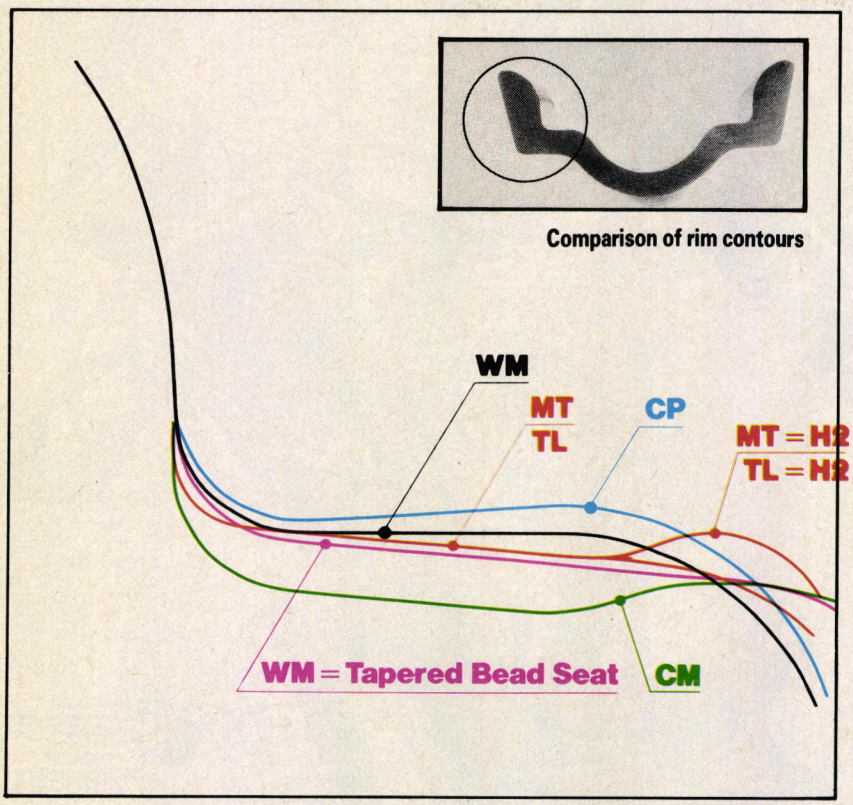
Techspeak

Wheel Rim Wars

The scene of much bloodshed



• Next time you bloody your knuckles fixing a flat, don't curse the tire for its stubbornness. Chances are it is the wheel rim and not the innocent rubber hoop that is causing your problems.

Many of the skin-tearing traumas of tire changing are caused by a lack of standardization in the motorcycle wheel industry. Unlike the car manufacturers, who have agreed on one world-wide rim profile, the motorcycle industry has no such standard. In fact, there are a total of *eight* different rim profiles in common use. And because it is both uneconomical to build and impossible to stock different tires for each rim profile, the tire manufacturers have to produce a one-size-fits-all design to accommodate each rim diameter.

You probably thought that all rims were the same because the difference is often difficult to detect without hacking off a cross section and measuring it. Certainly after wrestling off a flat tire, the last thing you will be interested in is the subtle shape of the inside of the rim. But you should take note—because it probably is the source of all that anguish you experienced.

Even without a cross section you can readily identify the basic elements of the rim. In the center is the bead well. That doubles as the location of the spoke nipples as well as somewhere for the bead to move during the installation of the tire. The bead moves there after being forced off the rim seat, the flat surface on either side of the well. As the name implies, the bead seat is where the bead of the tire is located when the tire is correctly inflated, and it is at the seat that rim diameter is measured.

The sides of the rim are pretty similar on most designs, but all the other dimensions, including the precise rim diameter, vary considerably. More importantly, even the actual shape of the rim itself can change, which makes the tire manufacturers' design tasks doubly difficult.

The nearest thing to an industry standard is the WM rim. This has a shallow and rounded bead well and a flat bead seat. Nonetheless, it still is unique in both these features. Probably the closest to the WM are the Japanese MT and the American equivalent, the TL rim, both of which have a more square-section bead well and a bead seat that angles up at five degrees from the center. These are also very similar to the Japanese WM tapered-bead-seat rim, which has a five-degree tapered seat.

All these rims have one big advantage in that tire removal is relatively easy. Because the bead is either flat or angled toward the well, the tire can easily slide down into the well once the bead is broken. Once the tight grip of the tire on the bead seat is released, the tire will naturally slide into the bead well. There it is effectively sitting on a narrower rim, allowing the tire irons to pry the bead over the rim more easily.

But the ease with which a tire falls into the bead well can be a distinct disadvantage if it happens unintentionally. And that is just what can occur when you have a puncture. Air pressure no longer holds the bead out on the seat and as a result the tire will quickly break loose, the bead dropping into the well and allowing the tire to squirm uncontrollably.

It requires little imagination to visualize the bone-chilling spill that can result from such an occurrence. And that is why rim manufacturers came up with the double-humped rim. The most popular example of this is the MT-H2 found on many Japanese machines. Having the same five-degree bead seat of the regular MT, the H2 version has a hump just before the bead seat slopes down into the well. It is this hump, found also on the U.S.-equivalent TL-H2 rim, that prevents a deflated tire from slipping into the well accidentally.

Your bloody hands will also remind you that this hump can make intentional tire removal a pain as well. It is difficult to break the bead away from the bead seat of the rim even with tire irons, simply because it is trapped in place by the metal hump.

Harley owners encounter a similar situation with the all-American CM rim. Similar in shape to the MT-H2, the CM does, however, have a much smaller bead-seat diameter which often falls outside the one-size-fits-all category.

Nor are owners of European models immune, either. BMW, Guzzi and Laverda all use a European CP rim which is different from anything else. In place of a bead seat sloping down to the well, the CP has a bead seat that actually rises at five degrees to the well to perform the same job as a double-hump rim. And with the largest bead-seat diameter of all the designs, the CP rim will stretch any tire to the maximum.

Still, any tire change will stretch the rubber hoop to the limit. And as your bloody hands attest, sometimes the tire does not want to stretch enough. But in the future don't just blame the tire, blame the rim, as well.

—David Dewhurst

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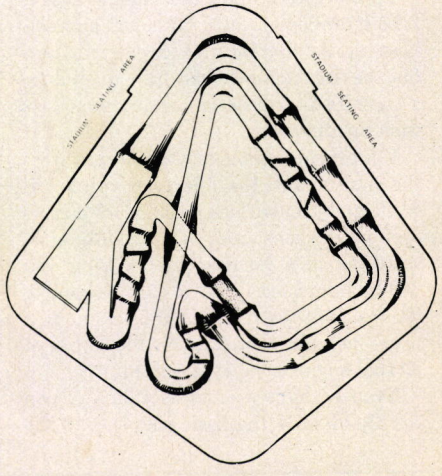


GUIDE LINES

Cycle Guide's Monthly Chronicle of Scoops, Tips, Rumors and Hard Facts

BY LARRY WORKS

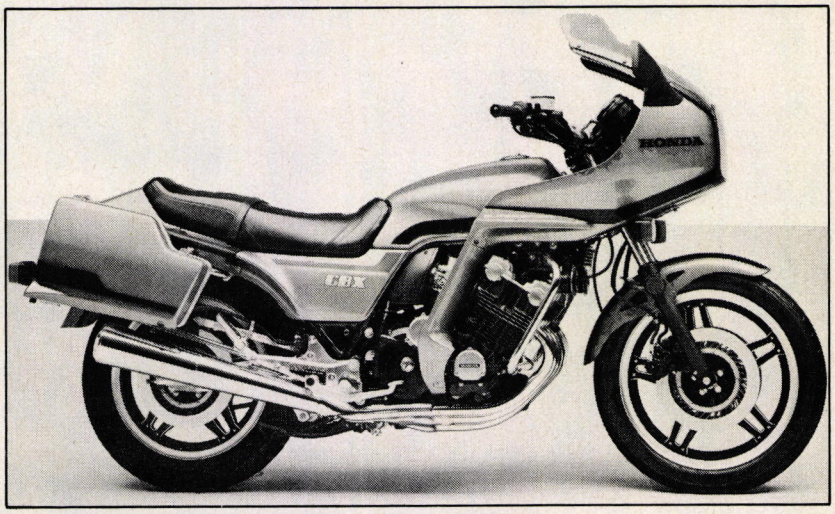
COMING SOON

• Notice a few more new-model shells dropping lately? Chances are that they're from Honda. Number One answered Yamaha's first salvo with a return volley that's designed to get you out of the trenches and into the showrooms. For street types, one of the major attractions is Honda's flagship, the Progressive Link Mono Suspension (Pro-Link) **CBX.** For 1981 the three-year-old sixgun has switched camps, going from straight performance to performance laced with **sport-touring** style. As evidence of that change, the new CBX wears a frame-mount fairing, engine guards and detachable saddlebags. A 5.8-gallon fuel tank also points to new goals for the CBX, as do the optional fairing-mounted radio, voltmeter and clock.

The changes dialed into the CBX don't just reflect bolt-ons and a dash more **flash,** though. Honda added new cams, a new exhaust system and altered the timing for a dose more midrange to get things going, while twin-piston brake calipers all around bring them to a stop. The suspension is all-new as well as being all air-spring for 1981. A 39mm fork handles the tasks at the front, while the damping-adjustable **Pro-Link** does double duty at the rear as both a suspension system and technoid's delight.

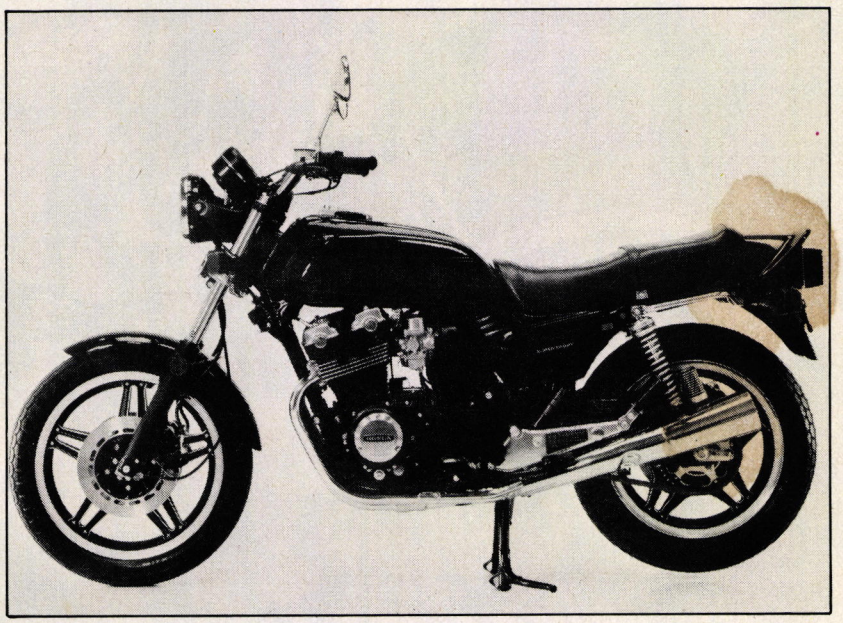
• When the CBX was shifted to a sport-touring role, it left Honda staring at a major **high-performance** gap in its 1981 lineup. To occupy that space, Honda stole a lick from its European market and brought in the CB900F. It's not a straight airlift from Europe, though. Aside from the forward-set pegs and the American-standard handlebar, the **U.S.** version has its 902cc 16-valve engine mounted in rubber in a stiffer frame. This version also has aluminum-body shocks with six damping adjustments and five preload settings. Like the CBX, the **900F** runs three double-piston disc brakes, a 39mm air-spring fork and a spoiler on the front fender that kicks oncoming air up to an oil cooler. CB750 fans needn't worry that the 900 will replace the 750F, though. Honda's battle plan for 1981 has room for both.

• Jumping down a few displacement notches, the next all-new street Honda is the Pro-Link **GL500,** with options designed for the **Lone Ranger.** Or maybe by him. By bolting on the different modular parts to the back half of the **Silver** Wing's two-piece saddle, you've got a choice between a conventional stepped seat or rider-only seating with either a small-capacity travel trunk or a larger trunk with a padded backrest. Long-rangers weren't ignored in the bargain, either. There's also an Interstate version that comes with frame-mount fairing, detachable saddlebags and the large trunk. "Heigh ho, Silver" jokes are standard equipment with either bike.



For 1981 the CBX wears a frame-mount fairing, saddlebags and a Pro-Link tail

More than just a change of clothes for Honda's venerable sixgun.



Honda has finally added its CB900F to American lust-lists

But the U.S. version still lacks some of the Euro-amenities.

• Don't start thinking that Honda put all of its attentions on the street for the new year. Of the **51 models** in the new lineup, nearly half are dirt-only or dual-purpose bikes. For example, there's the new XR/R series, which takes last year's XRs and pumps up the level of

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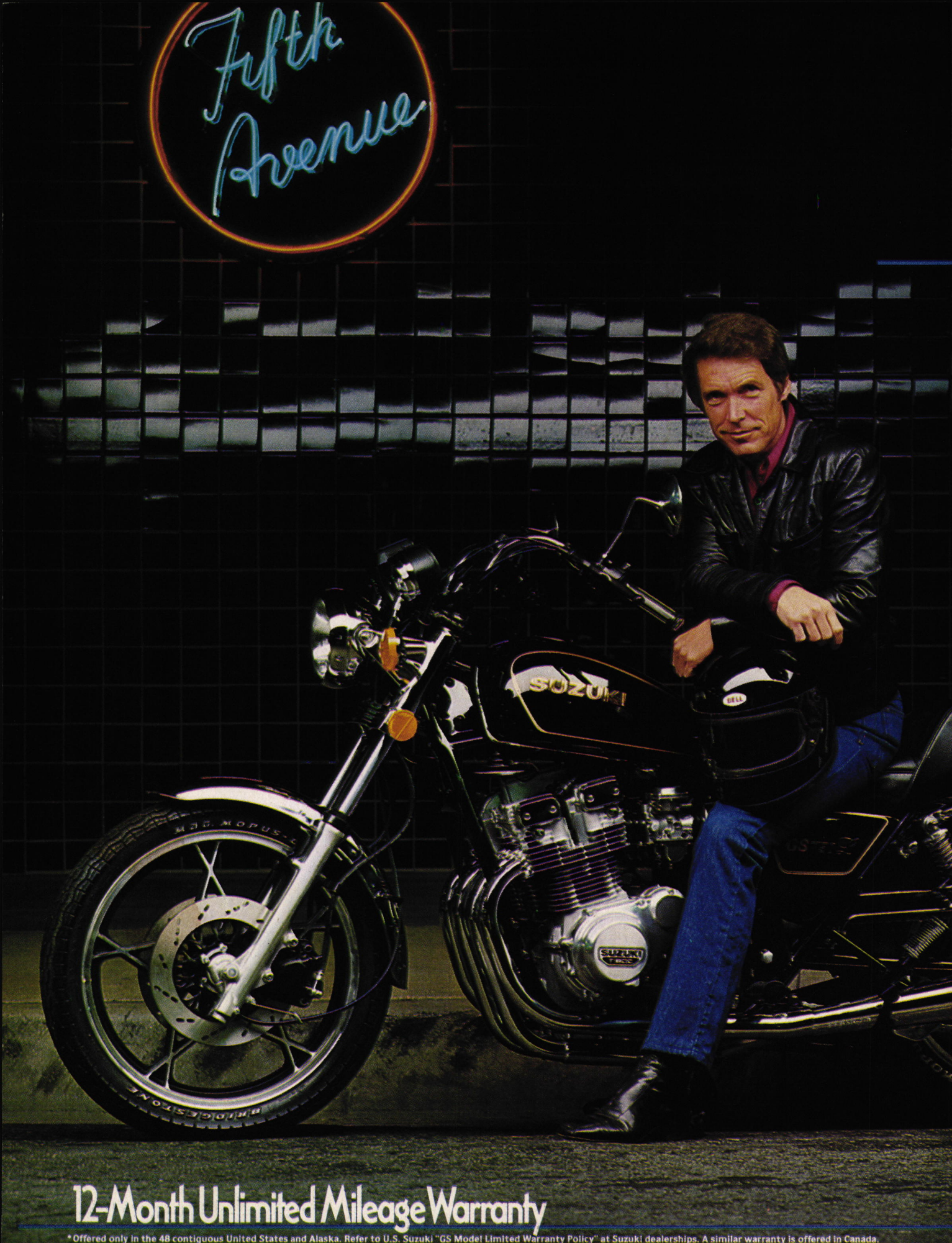

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Style and Sting.

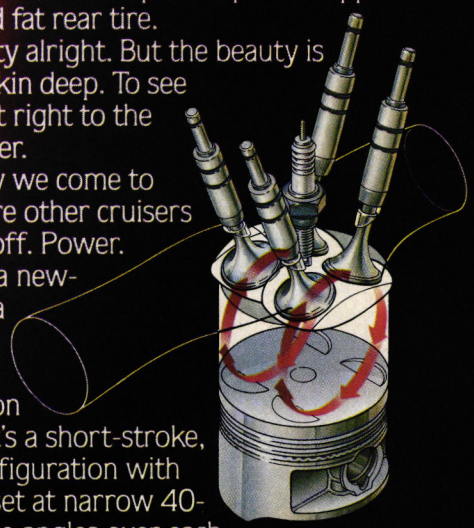
The Style. When it comes to low-riding 'specials', the new GS-750L is extra-special.

To understand why, you have to look past the beautiful exterior. Beyond the leading axle forks, pullback bars, teardrop tank, plush stepped saddle, chopped pipes and fat rear tire.

Oh, it's a beauty alright. But the beauty is more than skin deep. To see why, let's get right to the heart of the matter.

The Sting. Now we come to the part where other cruisers leave off. Power.

This machine uses a new-era engine. Namely a 4-stroke DOHC 16-valver with Twin Swirl Combustion Chambers. It's a short-stroke, big-bore configuration with four valves set at narrow 40-degree angles over each cylinder. This makes for compact combustion chambers where fuel flow is swirled about. So burning is quicker, cleaner and more efficient.



Result: Super high performance (especially in mid-range). And exceptional fuel economy.

Other extra-special features abound on this bike. Triple slotted disc brakes. Electronic ignition. Halogen headlight. Electric fuel gauge. And self-cancelling turn signals to name a few.

Suzuki also backs this stylish stinger with a 12-month unlimited mileage warranty.*

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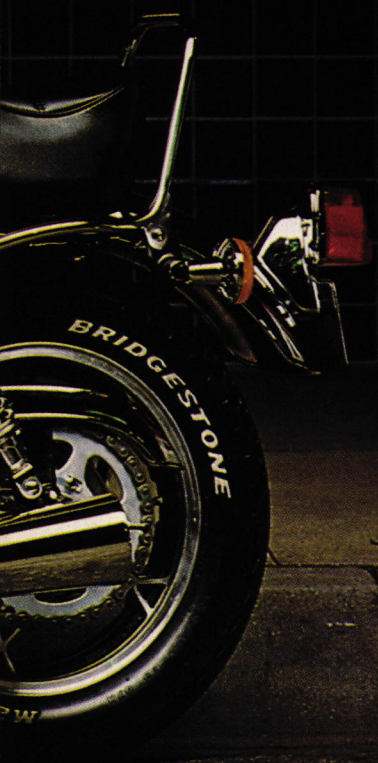

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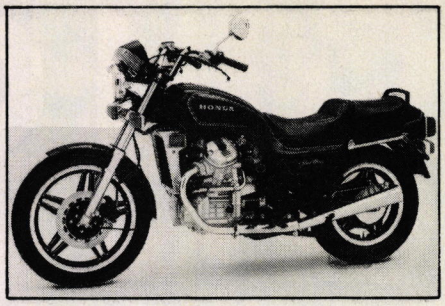
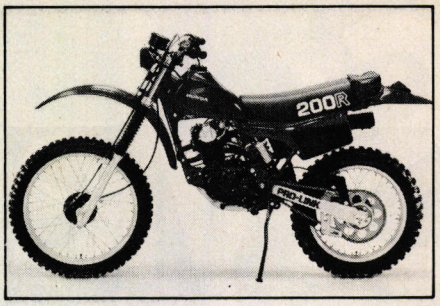


GL500 with split-level seating

New meaning for oneupsmanship.



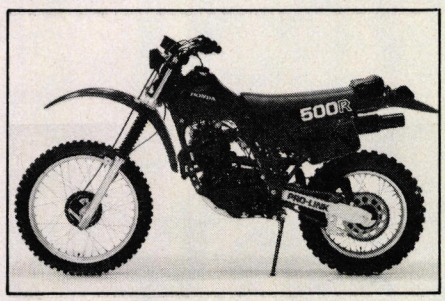
200R, Honda's littlest Pro-Link XR

Light, but no lightweight.

seriousness by a factor of about three. At the top of the list is the **XR500R.** Its four-way-adjustable Pro-Link and 37mm air-spring fork provide 10.2 and 10.0 inches of wheel travel respectively. Capping off the package is a double-leading-shoe drum front **brake** that Honda spokesmen say not only weighs less than last year's binder but provides 40 percent more braking force as well.

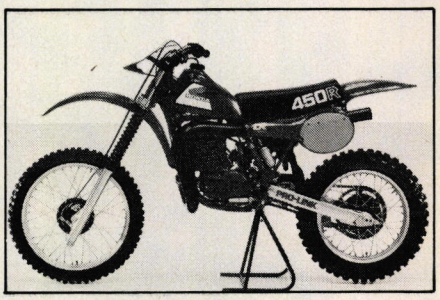
a shorter-legged XR200 without Pro-Link for nothing more **serious** than serious fun.

• Of course, if you really want to compete Honda's not about to stop you. There are, after all, the Elsinores to consider. For 1981 Honda has finally entered the motocross Open class, and in a big way. With a **431cc** reed-valve two-stroke that puts out 51 horsepower through a wide-ratio four-speed gearbox. Pro-



Pro-Link XR500R got suddenly serious

No one's smiling now.



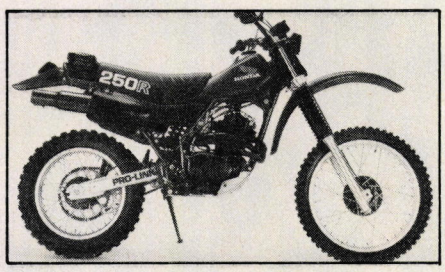
Finally cracking the Open-class barrier

With four speeds and 50 horsepower.

• Next of the new XR's is the 250R, which features the same frame, suspension and 12.9 inches of ground clearance as the 500. A **close-ratio** six-speed transmission has been added, and Honda is claiming a dry weight of 262 pounds and 24 horsepower from the quarter-liter thumper.

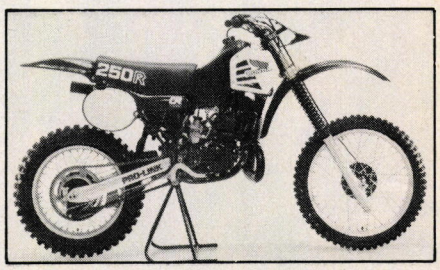
Link and a 41mm leading-axle Kayaba air-spring fork give the **biggest Elsinore** ever more than 12 inches of wheel travel anywhere you want to look, and a new 38mm tunable Keihin promises to let you look somewhere other than the carb.

• Take one step down and there's the **250**



Mid-size XR250R is built on 500's frame

Half the engine, all the suspension.



250 Elsinore is unfazed by long motos

More for longer is the way to win.

• The lightweight of the XR trio is the new 200R, which tips the scales at 233 pounds. Like the two larger XRs the 200 has **quick-release** wheels, a leading-axle fork and a box-section swingarm that pivots on needle bearings. It's also a Pro-Link six-speeder, with better than 9.7 inches of travel at each end—and **13.1 inches** of ground clearance. Or if competition is just too much work, there's also

Elsinore, the only 250 production **water-crosser** from a major manufacturer. The 250 runs the same frame and suspension as the 450, but a shorter swingarm cuts the wheel travel by a bit: The 250's got an even foot at each end. And an even 40 horsepower finds its way out of the **reboreable,** steel-lined cylinder. Honda engineers say that the two aluminum radiators behind the steering head

Continued

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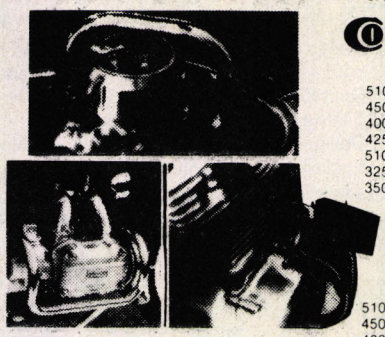

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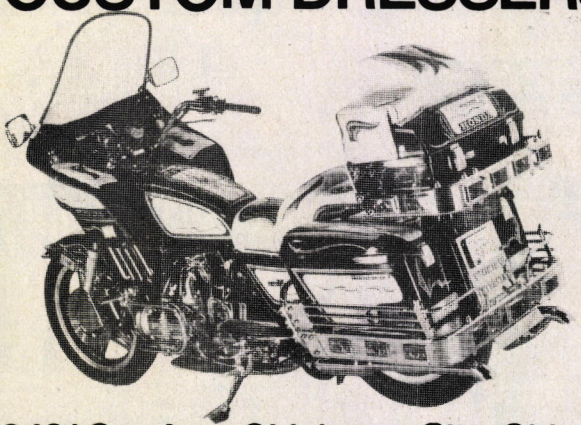

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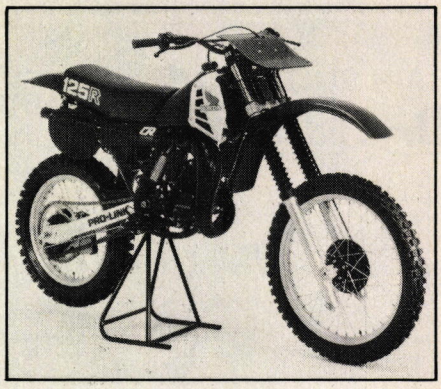


CR125R enters the watercloset for 1981

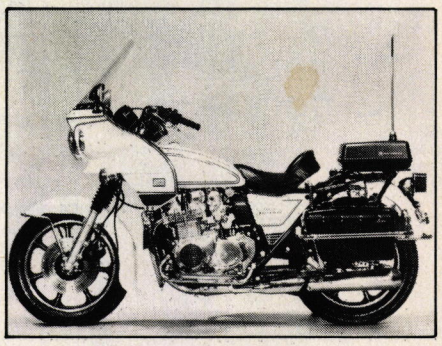
Riding the crest of the wetbike wave.

• For those hooked on hanging around the watercooler, there's also the **125** Elsinore. It shares considerable technology with the 250, but it's down a half-inch on wheel travel and up one gear in its close-ratio gearbox. That doesn't mean that it takes a back seat to the 250, though. Some sources say the 125 pumps out more horsepower than Honda's **1980** 125 **works** bike.

• If you've been diligently turning the pages so far, you might have gotten the idea that all the news has been at Honda lately. Not even close. Next month . . . **Kawasaki.**

FEDERAL CASES

• A recent California bill offers a classic case of good intentions that could go awry. The bill, AB2439, makes it **illegal** to operate a motorcycle that resembles a police vehicle. Bikes registered in California since January 1, 1979 are affected. A few exceptions, such as funeral escorts, movie bikes and the like, are written into the bill. So far, it all seems to make a great deal of sense—except that 2439



The real thing in black and white

It's worth a ticket to get too close.

doesn't spell out in black and white just what consitutes a lookalike **copbike.** Some sources first contended that motorcycles with a solid-white fuel tank, a black tank, a white-on-black tank or a black-on-white tank would be illegal. Not so, according to the California Highway Patrol. But the decision on where to draw

the line on police-type paint schemes and accessories is left up to individual police officers in the field.

• At the other end of the scale, Illinois took a **judgment call** out of the hands of the traffic cop and installed it firmly in the books. These days, if you're seen with a **wheelie** in your possession on Illinois pavement, be prepared to accept a ticket. Regardless of the circumstances, on-road wheelies are illegal in Illinois.

• Motorcyclists in California and Florida can relax for just a bit. MIC intervention resulted in motorcycle **noise** regulations for those two states being set back until 1982, which will coincide with new federal noise **regulations.** The new federal rules are expected to preempt any state regulations.

• Making the leap over to New Zealand shows some activity in **helmet** regulation. It's not a flare-up over helmet laws, though. The New Zealand Auto Cycle Union recently **banned** all painted polycarbonate helmets for all kinds of competition use.

HARD CASH

• Recycling seems to be the way of the future, and the motorcycle industry is no different from the rest of the economy. By all accounts, two-wheeled **recycling** is on the upswing. In fact, according to some reports, dollar sales for used motorcycles are expected to **jump** at an annual rate of 13 percent for the next two years.

• File this item under one step forward, one step back. Reports from overseas on Triumph's successful reorganization and refinancing were followed almost immediately with news of the demise of **Cotton.**

• New production is also in the offing for East German manufacturer **MZ,** following plans for a **new** $3 million **factory.** Don't start counting on the new bikes yet, though. The first production run from the new plant is expected in 1984.

• R.C. Engineering will continue its noncontingency award program for the 1981 **NMRA** season. As in 1980, R.C. will shell out **$10,000** to straight-line go-fasts.

• On the subject of money and racing, the **AMA** recently reported that successful Winston Series racers collected more than **$125,000** in 1980.

• Continuing with collections, figure this. And the next time someone tells you that motorcyclists aren't socially responsible, repeat it: The grand total collected by Harley-Davidson for research into muscular dystrophy in 1980 was $165,000. By the way, that's no one-shot deal, either. **"Bikers Fight MD"** will continue its efforts this year.

• The end of the money trail is where the news is these days, and **matching funds** from the U.S. Department of Transportation put Florida into the news recently. The Sunshine state became the fifth state to hire a full-time motorcycle safety coordinator. The post is also supported by MSF funding.

• When you're jouncing down some cracked

Continued

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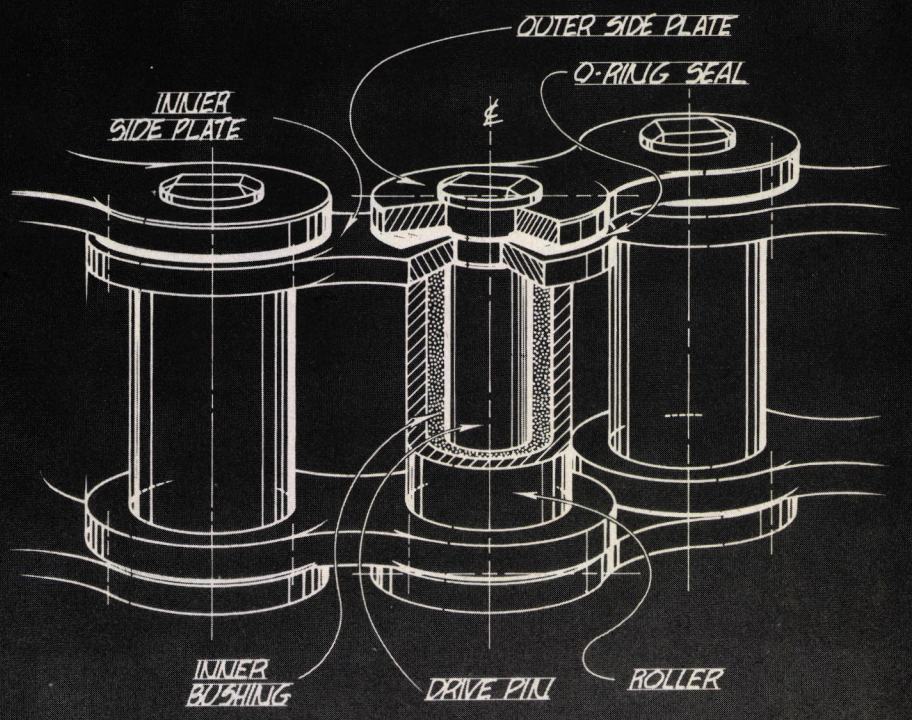

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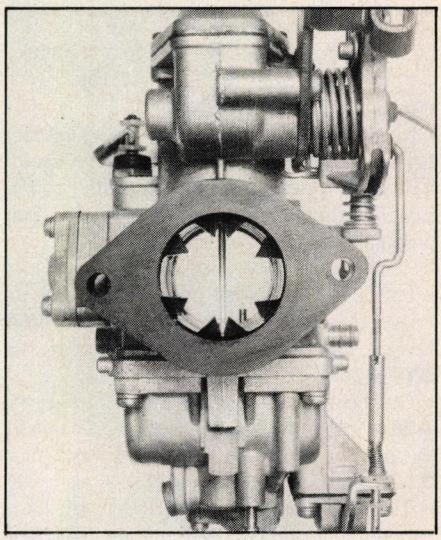
piece of **freeway** with your kidneys bouncing somewhere up around your ears, you might consider this small tidbit from the Highway Users Association. It could provide some insight about why an estimated two-thirds of the nation's highways are in various stages of **disrepair.** Current reports show that approximately **$2 billion** in highway revenues inexplicably wanders off from the programs for which it was intended.

AFTER THE FACT

• A studied look at page 42 of the September 1980 issue shows a number of interesting things about Harley-Davidson's **FLT** Tour Glide, including a 233-foot braking distance from 60 mph. Harley spokesmen felt that the bike was capable of shorter **braking** distances and suggested that the brakes might not have been fully bedded-in when the bike was tested. To find out, four months after the original test we repeated the 60-mph stop on what Harley-Davidson said was the same bike, with no modification of the brake system other than more time on the road. The **retest** showed that Harley might have been right. When the dust settled, a measurement showed that the FLT had stopped in 209 feet.

• If you read last November's issue, you might have noticed in a photograph on page 71 that a **Swarup** device inserted in an SR500 Mikuni carburetor looked a bit out of kilter. It was. The photograph was taken with the Swarup about 30 degrees clockwise of where



Swarup cyclone-maker in proper position

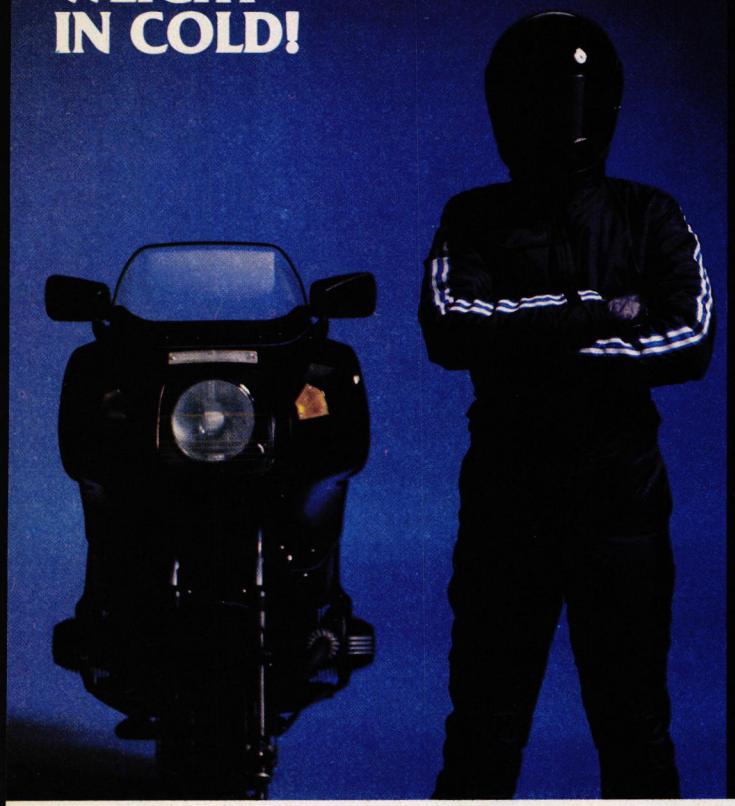
But the evaluation still stands.

it should have been. This photo shows the Swarup in place. The photograph didn't affect the **evaluation,** though, since the four Swarups that went into our CB750 testbed were installed as per the included instructions.

RUMORS

• Since Suzuki still hasn't come clean with its full 1981 lineup, the mill is ready and willing with speculation. One of the more frequently repeated notions these days is that Suzuki is

WORTH ITS WEIGHT IN COLD!



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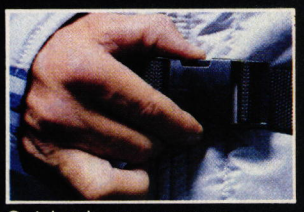
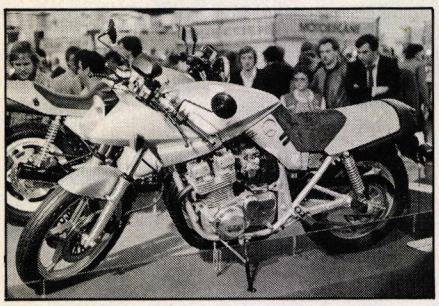


Quick release, cam type buckle is easy to open, even with one hand.

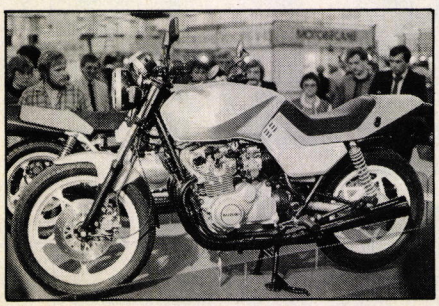
putting together a **single-shock** S-type **1100** as its 1981 flagship. Thankfully, most of this idle gossip has begun to fade lately. The current talk is that there will be an S, but it will run a more conventional rear suspension.

• But the rest of what's being said about this particular could-be S is anything but conventional. Some loose-lip types are strongly suggesting that the **S** that Suzuki will trot out this year is the **1100cc** Muth-designed bike that drew crowds at the **Cologne** Show.



Rumored Muth-built Suzukis at Cologne

Not unlike Antman's revenge.



• Many of those same sources also claim that the **Katana** GS650 that stood by the 1100 in Cologne will make the trip to the U.S. this year, perhaps as a limited-edition, all-out performance entry in the mid-size market.

• Not all the Suzuki gossip centers on the GS-series, though. DR and SP 500s are expected, and although a GN400 has been released as an early 1981 model, a little long-range free association points to a **GN500** single waiting somewhere, ready to enter the SR500 market.

• Other Suzuki-watchers are saying that the **GSX400** that was yanked at the last minute from the Paris Show will find its way to the U.S. If the rest of the story is true, 1981 should be a landmark year for 500cc-class riding. The reason is that this bit of fluff and gossamer starts out with the **16 valves** and the anti-dive front suspension of the showbike, then dials in enough of a displacement boost to make it competitive with the new KZ550 and 550 Seca.

• Another notable blip on the rumor scale is the Turbo Honda. It has generated considerable tales of what might be—not only about its own distribution but about a host of other related possibilities as well. Aside from the talk that the mating of **turbocharging** and the **Silver Wing** would be only natural, industry sources are already circulating stories about a second generation of Honda turbos that are designed from the ground up with turbocharging in mind.

• The debut of the Turbo has had other repercussions within the rumor market. With all of the attention focused on the CX500 right now, that old saw about a forthcoming **CX650** has surfaced again.

• And to top off the rumors that originated with the CX **Turbo,** reports from overseas indicate that since Honda antied up the boost—thus boosting up the ante—other manufacturers will be forced to follow. Those rumor-ripples extend pretty far when you stop to consider that the CX Turbo is not yet a production reality. Apparently, those ripples extend all the way to **Ducati** and Moto Morini. Conversation from Over There suggest that both marques are cranking up their long-term turbo projects in an all-out effort to strike while the turbo is hot.

• But all that turbotalk is not the only noise about Honda. Reliable sources are already beginning to work on the 1981 **CB900** as the basis of future rumors. Reportedly, the 900 is not in its final configuration . . . or displacement. The talk is that a **liter-size** version will roll down the pike within the year.

• Yamaha might have played out all of its 1981 cards already. Then again, as some insiders are claiming, there could be an ace or two left. Specifically, what they're talking about are **rearsets,** a quarter fairing and a full line of go-fast accessories that Yamaha will announce for the Seca-series motorcycles.

Continued

The class of its class.

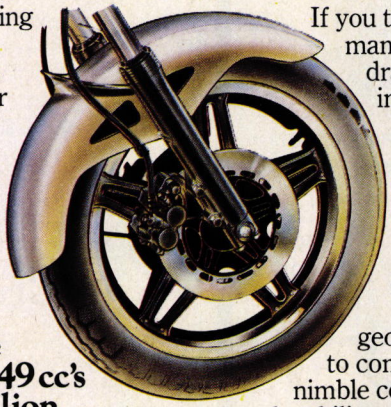
The 750 cc high-performance class is no slouch when it comes to competition.

So it may come as a surprise when you stop to think that it has been dominated for over two years by one motorcycle. The Honda CB750F.

But while everyone else has been playing catch up, trying to match the performance of the CB750F, Honda has not been resting on the machine's laurels.

So when you see the ever increasing flood of claims that one bike or another is a match for the CB750F, Honda would like you to keep one thing firmly in mind.

The 1981 Honda CB750F is even better than ever.



Both the dual front and single rear disc brakes feature Honda's new twin piston calipers.

Four-cylinders, 16 valves, double overhead cams, 749 cc's and maybe a million high-performance miles.

The CB750F engine is not the newest design in its class – merely the most advanced. It features the Honda Pentroof™ combustion chamber design for central spark plug placement and high combustion efficiency. Four valves per cylinder enhance clean burning of fuel and efficient exhaust. And the direct valve system, because it is lighter than a rocker arm system, allows higher engine rpm's and minimizes valve float. And of course, less weight is always a consideration on a high-performance machine.

The double overhead cams are driven by dual multiplate chains, which are both strong and long-wearing.

Carburetion is by four 30 mm constant velocity units with an accelerator pump for quick, crisp throttle response. Transistorized pointless ignition delivers a reliable, hot spark throughout the engine's performance range. And never needs adjustment or other maintenance.

The exhaust system is a highly efficient four-into-two.

This is the engine that is the basis for Team Honda's Superbike road racers. The engine that has propelled the CB750F to its rightful place as king of the 750 class performance machines. It is a proven performer.

Some new twists on handling.

If you think high performance is straight line, dragstrip speed and nothing else, read no further. Because to the CB750F, high performance means the quickest way to get from point A to point B, regardless of how many curves are in between.

Start with frame geometry, designed to combine quick, nimble cornering and high-speed stability. Add new 37 mm air adjustable front forks. With an equalizer to facilitate filling.

Needle bearing swing arm pivot virtually eliminates wear and looseness.

A needle bearing swing arm pivot provides precise alignment, vitally important to proper handling. And the new Honda VHD™ shocks are adjustable 30 ways to match load, road and riding conditions. The highlighted black ComStar™ wheels are mounted with wider than ever tubeless tires for a bigger footprint on the road.

A crucial part of going-stopping.

High performance sport riding requires precise, effective braking. The Honda CB750F utilizes a triple disc brake system. One slotted disc in the rear, two slotted discs in front. All with twin piston calipers, for added caliper rigidity and more positive feel.

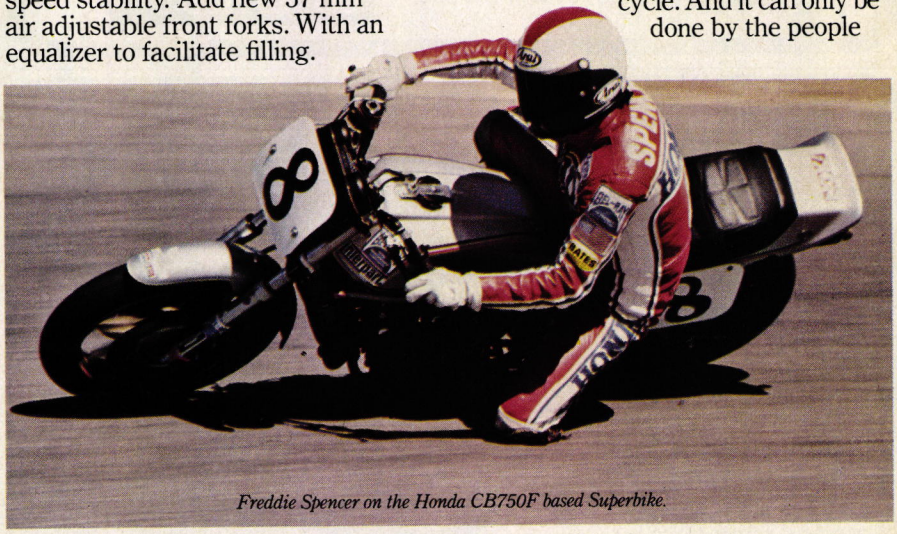
One thing no company can build into a bike. A reputation.

No motorcycle rolls off the assembly line a proven winner. Most simply roll on into oblivion.

It takes years to build a reputation as a high performance motorcycle. And it can only be done by the people who know and ride and talk about this kind of motorcycle.

If you know one of these people, see what he has to say about the Honda CB750F.

If you are one of these people, you already know.



Freddie Spencer on the Honda CB750F based Superbike.

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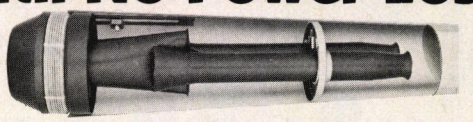

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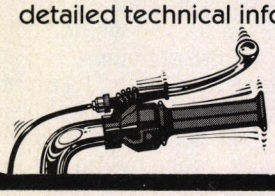

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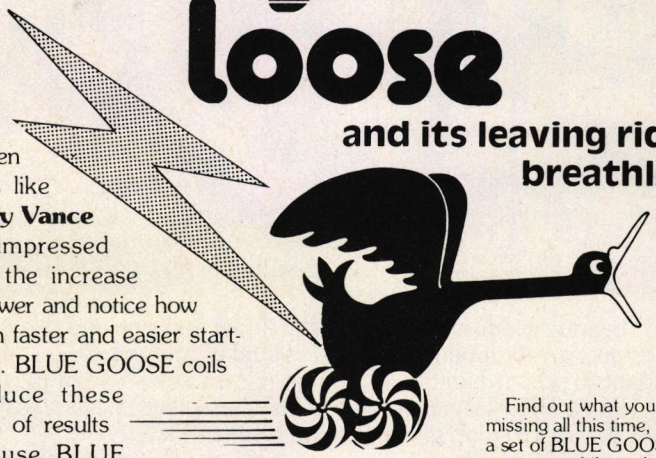

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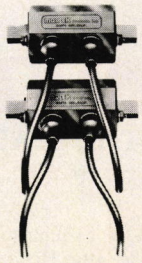

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• If even half of the rumors pan out 1981 will be a banner year for new technology. For instance, the reality of single-shockers includes all the Japanese motocrossers this year, while the rumors of lone shocks continue to spread. Husky and Maico have already been mentioned, and KTM is the newest subject of single-shock gossip. Reportedly, **KTM** is working on an Ohlins-damped **one-shocker** right now.

• All told, 1981 will be remembered for its trends, which are legion. First, this will be known as the year of the water-pumper. But that's not all; one-shock rear suspensions reached out to include the major motocross marques as well. And single shocks found their way onto U.S. street bikes in 1981. With all that widespread innovation, 1981 will be hard to define as the year that highlighted one single development. Not so **1983,** proclaim the industry naysayers. They promise that it will be easy to label. It will, by all reports, be remembered as the year of the **catalytic convertor.**

APART FROM THE CROWD

• What can you do with all those old **Gold Wings** you've got lying around the house? Well, you could trade them in, but if you're Ron Will, you might just turn them into **Phantoms.** Add a Kevlar shell, three seats, some digital instrumentation and a third wheel, and hey presto, you won't even recognize the old 'Wing. And just contemplating the $19,000 pricetag is guaranteed to relieve any symptoms of boredom.

Phantom where Gold Wing used to be

For those who don't speak kickstand.

• This belongs in the Mr. Wizard file. You've probably been duplicating the efforts of a group of Pennsylvania State researchers, without even knowing it, since the day you started riding. The group recently issued a report that states conclusively that **traffic aids** that are pasted or painted onto pavement are slippery.

• Always on the alert for methods of cutting accident rates, the Motorcycle Safety Foundation has reported a novel way to improve your **odds** on the highway: Move to North Dakota. Say you started in Louisiana, for instance, where the chance that you'll be in an **accident** is about one in 10. The way the statistics read out, a move to North Dakota would make you somewhere around nine times less likely to end up meeting the ground. •

THE SIX MILLION DOLLAR MOTORCYCLE:

Honda CX500 Turbo

Honda has the technology to make your next superbike lighter, stronger, faster. The future is now.

BY MICHAEL JORDAN

At the moment the Honda CX500 Turbo was unveiled at the Cologne international exposition last September, the motorcycle world shifted on its axis. Every once in awhile, a motorcycle appears from the other side of tomorrow and makes all other bikes look obsolete. The CX500 Turbo was just such a message from the future.

As the first experimental motorcycle from Honda ever to be shown outside the confines of Honda Research and Development, the Turbo's appearance at Cologne was completely unexpected. Even so, it matches CYCLE GUIDE's forecast of the turbocharged future made in the October 1980 issue. Honda's own written description of the CX encapsulates the bike's importance: "... Honda believes turbocharging should be applied to smaller displacement engines in order to give them some of the features presently inherent only in larger engines. The result is the prototype motorcycle exhibited here ... a turbocharged, liquid-cooled, vee-twin 497cc model that features the operating economy and handling of a smaller motorcycle as well as the performance of a larger displacement motorcycle."

The Turbo CX means much more than just the long-awaited matching of float-like-a-Bonneville and sting-like-a-CBX philosophies, though. It may be an experimental motorcycle not yet scheduled for production, yet it does chart Honda's course for the next decade. From the turbo to the progressive-rate rear suspension to the integrated styling, you can find things that will appear on future Honda bikes.

For this reason, CYCLE GUIDE cornered Honda representatives soon after the Turbo CX's introduction and wangled closeup and personal access to it, something no other publication anywhere has been granted. Since the Turbo incorporates more than 230 patents filed for in Japan, Honda unfortunately will not permit anyone to ride the bike—indeed, it is loath to discuss the mechanicals in any detail. Nevertheless, we were able to construct an accurate profile of the CX500 Turbo thanks to our own expertise, conversations with outside experts and talks with highly placed sources at Honda. The result is a fascinating portrait of an important motorcycle, confirmation that the CX500 Turbo will be regarded as one of

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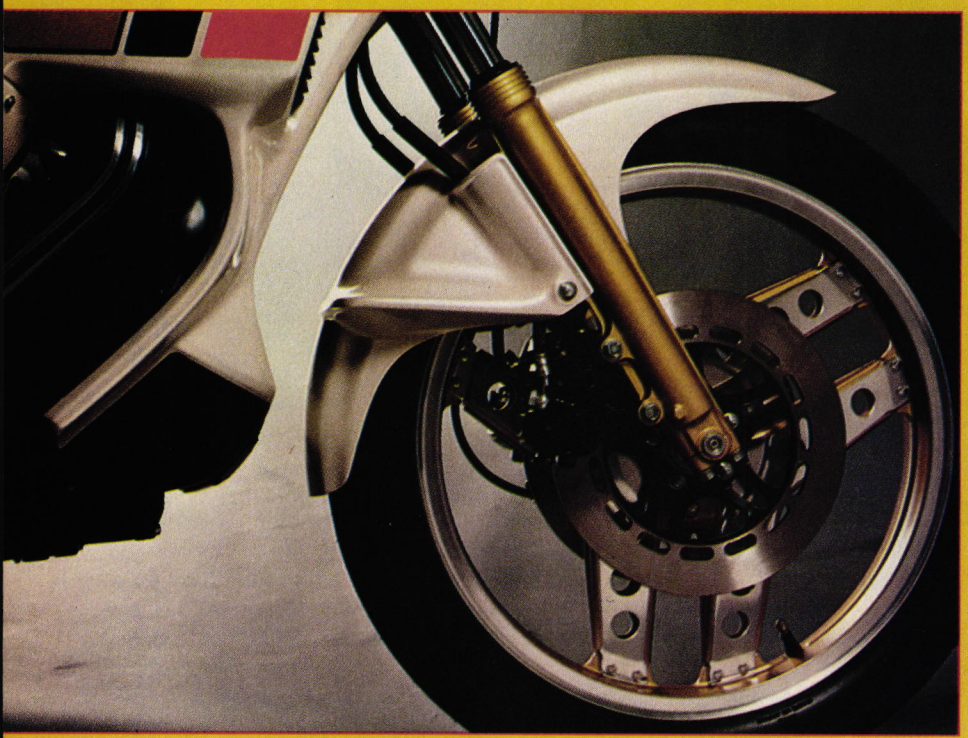
Tiny turbo läder lives beneath water radiator, solving usual installation problems. Spoiler integrated into fender directs cooling air to the turbo and radiator. Turnsignal fitted to cooling duct is unobtrusive.



The Turbo carries the V-rated rubber from the CBX, but it's the gold-anodized and chrome ComStar six-spoke wheels and twin-pot brake calipers that attract attention.

the turning points in motorcycle design.

Naturally, this motorcycle began with turbocharging. Honda selected the CX500 engine specifically because of its liquid-cooling, which enables it to cope with the heat of turbocharging. Kazuo Inoue, leader of the Turbo project and the No. 1 man in Honda R&D's engine division, says the CX500's displacement suited Honda's purposes as well: "We set out to make a little motor and measure it by the performance standards of a big bike." Both the size of the engine and its configuration caused serious problems, however, as Inoue points out: "It's very difficult to adapt (turbocharging) to the long interval between vee-twin power pulses. The larger air volume produced by four-cylinder and six-cylinder engines would make it much easier."

As Inoue says, small engines do not generate enough exhaust to spin the usual-size turbocharger fast enough to create boost low in the engine's rpm range. Since no small turbos were available, Honda first turned to supercharging seven years ago when its experimentation with blower technology began. A screw-type impeller from a refrigeration unit was used, but problems with poor carburetion and abrupt throttle response forced Honda to turn to turbocharging three years ago. At that time, Honda discovered that a Japanese company known as IHI manufactured a line of turbos small enough to be adapted to even a 500cc motorcycle.

As a result, the CX500 Turbo employs a turbocharger built by IHI to Honda's specifications. It has an A/R ratio of 9 compared to the A/R ratio of 25 or 40 of the Rajay turbos seen on most aftermarket turbobikes. Like all IHI turbos, the CX model features small external dimensions, light weight and low rotational inertia. Honda mounts the turbo in *front* of the engine, taking advantage of the available space and cooling flow of air. Thanks to the small A/R ratio and the IHI turbo's distinctive, highly efficient, backward-curved compressor wheels, boost builds at an incredibly low 2500 rpm. An integral wastegate controlled by intake manifold pressure (see schematic of the engine system, page 40) prevents the small turbo from overboosting the engine. In order to churn out 76 horsepower at 8000 rpm, boost is set to a very high 14 psi. Also, the engine produces more horsepower at 5000 rpm—55.34—than any other motorcycle engine that Honda sells to the public.

A small turbocharger helped Honda cope with the CX's limited displacement, but turbocharging itself posed further problems. The variations in intake pres-

sure due to the turbocharger's boost make carburetion very tricky. For that reason, the CX uses electronic fuel injection built by Nippondenso to Honda's specs. In electronic fuel injection, a number of sensors monitor conditions within the engine and pass that information to a control unit. The control unit digests the information, determines the ideal air/fuel mixture, and then squirts fuel directly into the intake ports. Fuel injection has come late to motorcycles because first-generation electronic units could not withstand high-frequency vibrations (on the order of 10*g* accelerations) while dirt and oil further compromised durability. Mechanical units, meanwhile, are too bulky. Only the latest microchip technology makes reliable electronic fuel injection possible.

Sources at Honda indicate that the ND fuel injection could be the key to solving problems caused by the vee-twin's irregular intake pulses. In order to always have enough air available for instant throttle response—one of Honda's primary goals—the plenum chamber is larger than normal, almost like a still-air box on a carbureted bike. Even with this feature, however, the usual mechanically operated vane in the intake system used to measure the volume of air flowing into the cylinders—a crucial sensor for the fuel system's brain—can be confused by irregular intake pulses.

For this reason, we believe Nippondenso has abandoned the mechanically operated sensor vane for one of two alternatives—either a sensor to measure the air-pressure differential across the throttle valve or a hotwire anemometer. ND is known to have developed a hot-wire anemometer, so this could be the most likely choice. This system measures the amount of current required to maintain a constant temperature differential across a series of wire grids in the sides of the intake tract. More air flow cools the wire grids and so requires more current to maintain temperature. In this way, the density of the air can be measured instead of just the volume, an advantage in the superheated intake tract of a turbobike. The hot-wire system can not only sense air flow in either direction, but its response time is 0.002 seconds, providing extremely accurate carburetion that can respond to a vee-twin's uneven pulsations.

The CX500's crankcase is apparently strong enough to withstand life under pressure, but a number of other internal modifications are necessary. First of all, the compression ratio has been reduced from 10.0:1 to 8.0:1 to forestall detonation of the heated intake charge (even so, 94-octane fuel is still required). Such a reduction in compression ratio leads to some loss

More than turbos are at stake here. This is an idea bike for the Eighties, a forecast of motorcycling's entry into a new era of speed.

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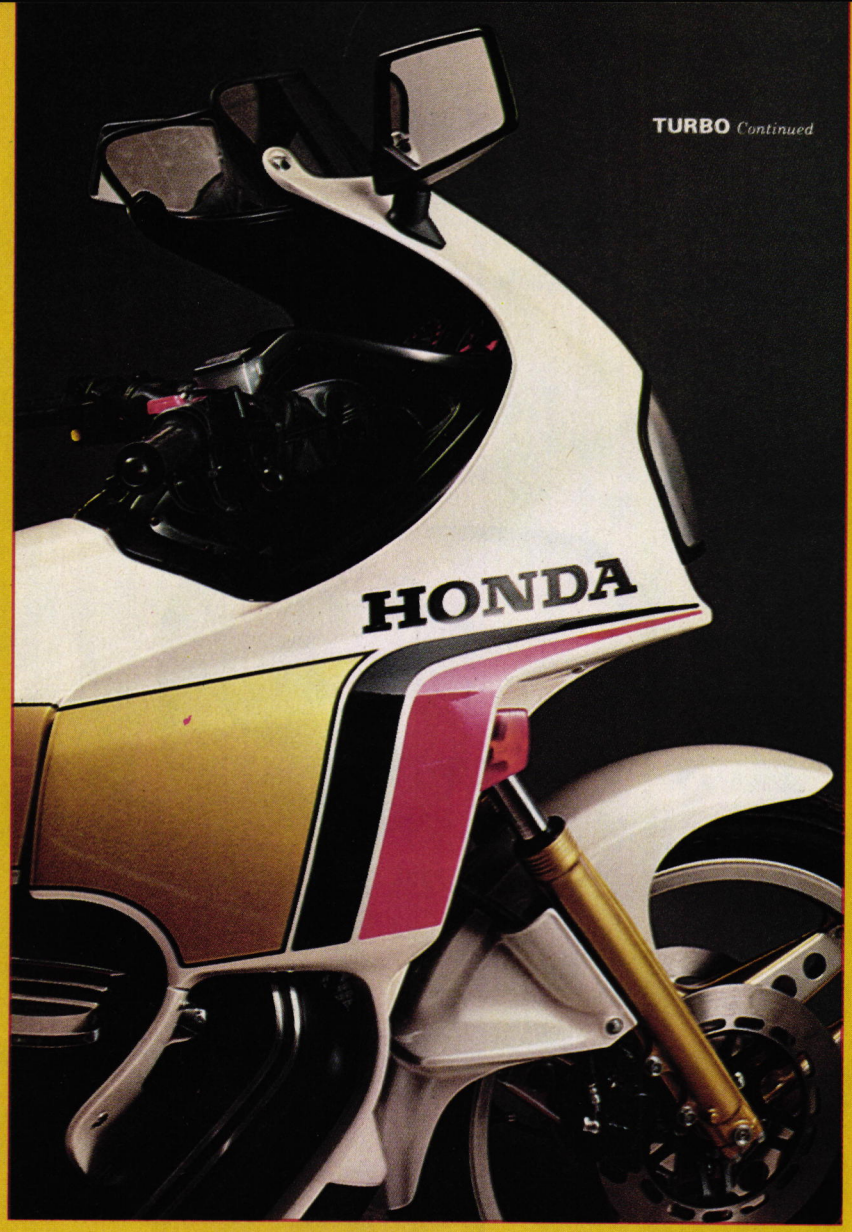
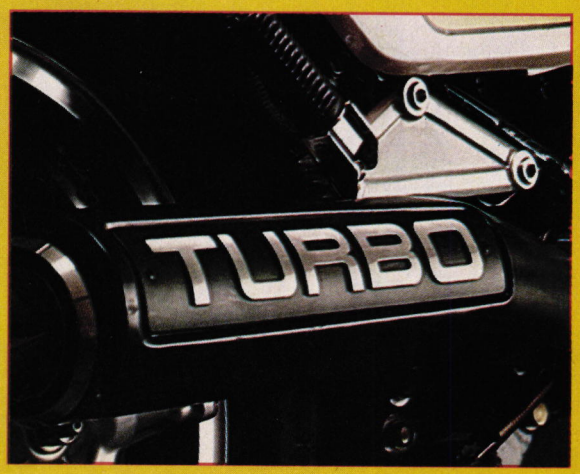


The Turbo CX's bodywork is simply stunning. Stylist Morioka employed the latest trend to integration, but avoided a radical fully enclosed fairing. His accomplishment can be measured by the fact that the bike looks evolutionary, largely because traditional motorcycle proportions have been preserved.



in fuel efficiency and throttle response, yet turbo research by Porsche reveals that the emissions picture is improved by the reduction of both HC and NOx.

Other internal engine modifications probably include the substitution of stronger forged pistons for cast pistons. Since the underside of the CX500's pistons are already cooled by an oil spray, no further measures to prevent piston overheating should be required. The engine itself requires additional cooling, though, so the front fender carries a lip to direct air into the radiator while an oil cooler is carried in the fairing just below the headlights. In terms of other modifications, Honda also admits to strengthening the transmission, probably including a stronger clutch and an increase in spring preload for the cush drive connecting the transmission to the driveshaft. Since the CX500's rear end does double duty in the GL1100, it probably didn't require any modification.

A turbobike is much more than just engine and drivetrain to Honda's way of thinking, however. So every aspect of the motorcycle has been calibrated to match the high-performance standard set by the turbocharged engine.

To begin with, a Silver Wing CX-chassis with Pro-Link progressive-rate rear suspension cradles the engine. Honda engineers say that Pro-Link permits the combination of soft initial suspension rates for a comfortable ride with firm control at greater suspension deflections (see page 41 for a discussion of Pro-Link). The same philosophy accounts for the use of the air-spring fork from the 1981 CB750F. The Turbo also uses the brakes from the 1981 F-type. The front brakes are remarkable for the use of Honda's new twin-piston calipers in which each single-action caliper now has two pistons with twin pucks side-by-side at the outer edge of the disc. This configuration increases rigidity while reducing caliper weight, and the caliper has more leverage on the disc, improving feel.

The Turbo carries the V-rated rubber from the CBX, but it's the gold-anodized and chromed ComStar wheels that attract all the attention. Only six pieces are required to make up the spoke structure instead of 10. The wheels also lack the standard ComStar wheel's rib around the inside of the rim. As a result, these wheels look lighter and airier, and they're actually cheaper to manufacture.

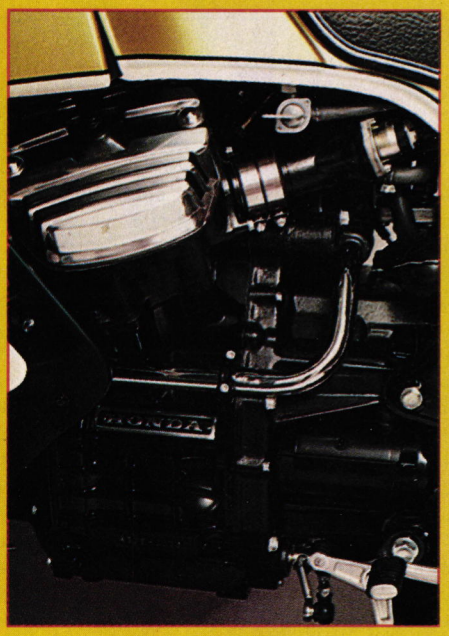
The bodywork is simply stunning. A Honda R&D stylist named Morioka designed it. Although his personal interest is in motocross bikes, he also penned the CB1100R and CB250RS shapes. His accomplishment can be measured by the fact

that the bike looks sophisticated without being radical, largely because the traditional proportions of seat, tank and fairing are preserved.

Honda has been doing a lot of work with fairings in the last three years, so it's no surprise to see one on this bike. Honda thinks fairings are primarily improvements in rider comfort, for even the cleanest fairing can improve fuel economy only three to five percent. Ikuo Shimizu, Motorcycle Sales Staff Coordinator for American Honda says of fairings, "One big disadvantage of the motorcycle is comfort, so any way we can add comfort to the motorcycle will be very important to its success." Like all of Honda's fairings, the Turbo's fiberglass has been wind-tunnel-calibrated for aerodynamic stability and comfort. Both touring and sporting riders respond to it enthusiastically. The touring guys appreciate the apparent amount of wind protection you receive while planted in the seat's dual-density foam, leaning slightly forward to reach the CBX-style handlebar. The sporting riders relish the integrated turnsignals, H-4 Stanley halogen headlights and a windscreen that looks good without compromising function.

As with the rest of the bike, even the instrumentation has been executed with the right mixture of sophistication and tradition. Because scientific studies indicate analog functions are recognized by the human mind quicker than digital functions, Honda leaves computer-think to the Cadillac Seville. So the tachometer and speedometer are traditional. The rest of the gauges are different, though. The fuel gauge signals fuel level in colored lights that progress from green to red. The engine temperature gauge progresses from blue to green to red. An EFI light signals the health of the injection unit when the ignition is turned on. The most fascinating gauge to watch is the boost indicator, which expands in a horizontal band as boost rises.

Taken all together, the success of this prototype is explained by the fact that it looks evolutionary instead of revolutionary. It is the next step in motorcycle design, ready for the production line. Sure it's new, it's bold, it's different—but it's also the logical extrapolation of our present knowledge of how motorcycles should look and behave. Honda might think of the CX500 Turbo as an experiment, meant to measure the enthusiasm for turbobikes. But in the minds of CYCLE GUIDE's staffers, there are no reservations about its eventual success. All that remains is to fire up the production line. Our throttle hands are already itching in anticipation. •



Electronics have come late to motorcycles because of problems with durability. The latest microchip technology permits the use of sophisticated fuel injection and instrumentation units.

Continued

Pro-Link: Progression Is Its Most Important Product

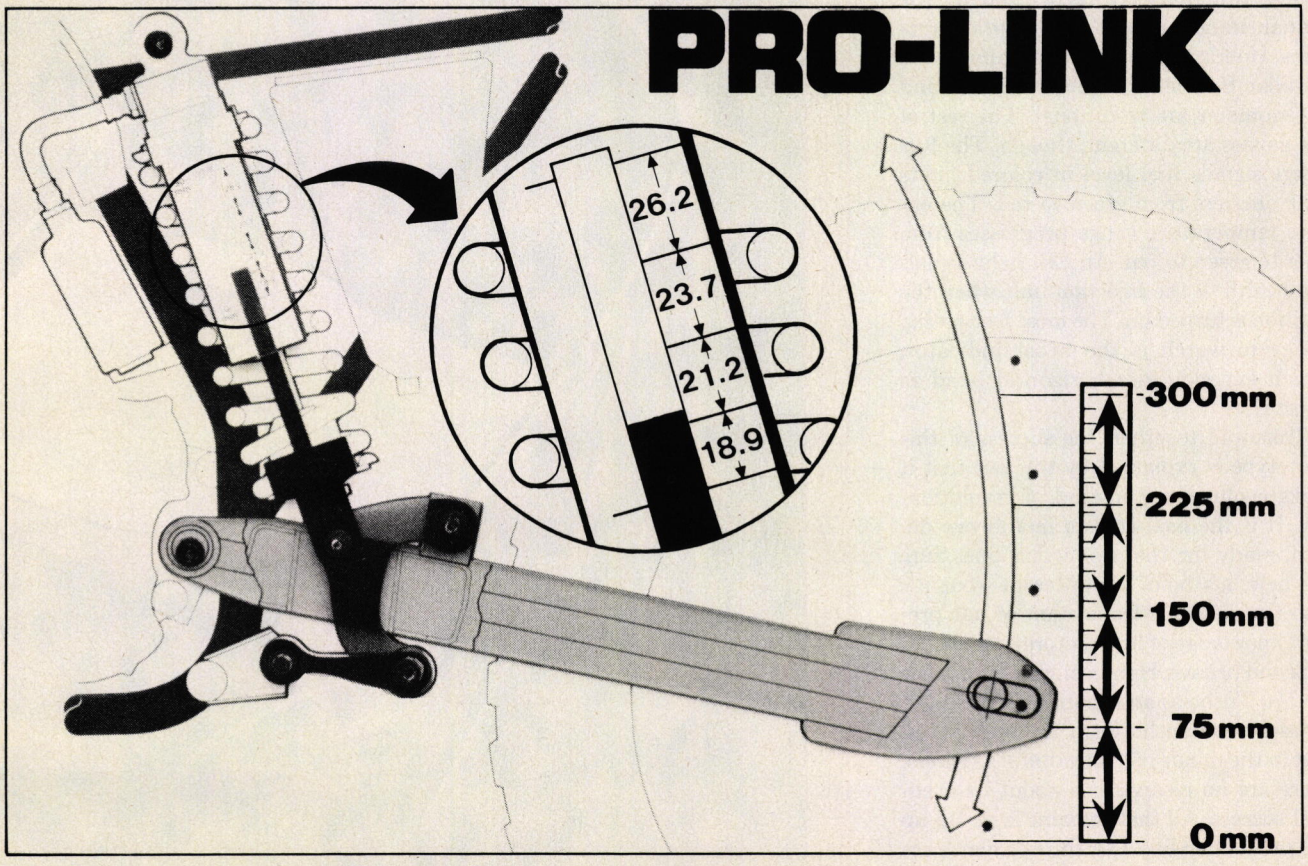
• The CX500 Turbo may be Honda's motorcycle of the future, but its rear end is held up by the company's suspension of *today*. It's a single-shock arrangement called Pro-Link, as if you didn't already know, and you'll find virtually the same thing on two of Honda's newest street models and three of its XR-series playbikes, plus a trio of CR motocrossers, the direct descendants of the factory racers that debuted this concept to the public late in 1979.

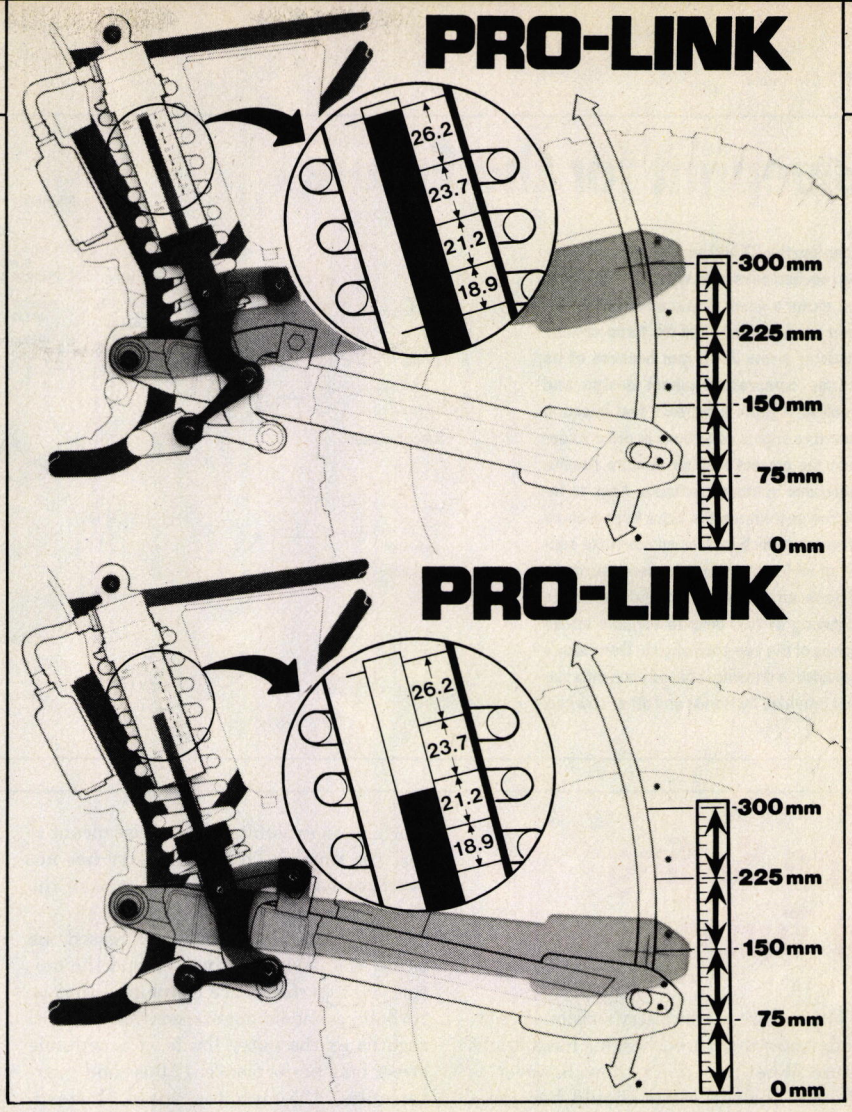
Hold the applause, though, if you think that Honda was somehow able to rush this new suspension from works-bike experiment to production-line reality in just one year. Because that's not how it happened. In actuality, Pro-Link (a contraction of "Progressive Linkage") is simply the latest in a succession of rear-suspension developments that began more than seven years ago. That's when Honda's strategists eyeballed Yamaha's then-new Monoshock system and decided that their bikes, too, needed a more sophisticated kind of rear suspension. Not necessarily one with a single rear shock, but definitely one that could do what seemed impossible with Yamaha's Monoshock—or, for that matter, with *any* motorcycle rear suspension up until then: offer rates of springing and damping that were truly progressive and constantly in balance with one another—the much-sought-after "rising-rate" suspension.

Many shock-absorbing innovations soon poured off of Honda's drawing tables, but it was not until mid-1978 that a workable system was developed by the NR (New Racing) Group at R&D. The first installations were on a few select works motocrossers; and that system was, in principle, just like the current execution of Pro-Link except that it used *two* rear shocks—both of them totally conventional and positioned almost in an orthodox forward-mount location. But there was an all-important difference: The bottom eyelets of the shocks were not firmly anchored to the swingarm. Instead, each eyelet attached to an L-shaped rocker arm that pivoted on each side of the swingarm. The bottom eyelet of each shock attached to the rear end of its respective rocker, and a short linkage rod connected each forward end to a point on the frame just behind the swingarm-pivot bolt.

This linkage was a simple but effective way of making a shock compress and extend in a non-linear manner. The linkage articulated during the upward stroke of the swingarm and caused the rate of shock compression to progressively increase in relation to the rate of rear wheel movement. Conversely, the rate of shock extension progressively decreased on the wheel's downward stroke. Therefore, since each successive inch of upward wheel travel resulted in an ever-increasing amount of shock movement (engineers would term it a progressive decrease in the wheel's mechanical advantage over the shock), considerably more force was required to compress the suspension through each successive inch of travel than through the one before it. So although the shocks themselves had only single-rate springs and straight damping rates, the actual *wheel* rates were truly progressive, thus achieving the desired rising-rate effect.

It takes little imagination to see the beauty of this system, especially in the way it can deal with the wide range of chassis punishment encountered in motocross racing. Its light spring preloading and soft initial wheel rates allow rapid, accurate and easy compliance over choppy terrain. This can, of course, be accomplished with almost *any* suspension system; but the traditional problem has been that it allows the absorption of small bumps to consume so much travel that bottoming occurs too easily. With a progressive suspension, however, the wheel rates gradually escalate and thus





prevent premature bottoming. Moreover, since the spring and damping rates of the shocks are affected equally by the system's changes in mechanical advantage, their relationship remains the same throughout the travel—provided, naturally, that they were in balance to begin with.

Therein, in fact, lies the problem with attempting to have rising rates with a conventional dual-shock suspension or a Yamaha-style Monoshocker. By design, they must compress the shocks at a more-or-less linear rate. A rising spring rate can be achieved with an air assist or a progressive-wind coil spring, but doing likewise with the damping isn't as easy. A series of blow-off valves and other pressure-affecting devices can be put in the damper mechanisms to give reasonably progressive damping; but such methods are expensive, and it is difficult to match the progressiveness of the resultant damping to that of the springing throughout the entire range of wheel travel. With Pro-Link, though, that matchup is maintained automatically.

Soon after the development of the twin-shock Pro-Link, Kawasaki announced Uni-Trak—also a rocker-linkage suspension with rising-rate capabilities—so Honda quickly converted its system to a one-shock design. And that manifestation of Pro-Link, first seen publicly on the RC250 works bikes at the Anaheim Supercross in November of 1979, was essentially identical to the system used on production Hondas.

Because of Pro-Link's off-road advantages, combined with a harsh reality of another sort—the fact that having some kind of single-shock rear suspension had become a status symbol in motocross—everyone fully expected Honda's 1981 CR models to have the new suspension. But few anticipated seeing it on two street models so soon. The truth is, though, that while Pro-Link doesn't offer quite as many benefits on the pavement as in the dirt, it still has enough pluses to justify its use on road-going motorcycles. Its facility for handling a wider-than-normal range of road and load inputs is especially suited to touring bikes, just as is not having any shock absorbers bulging out at the rear, allowing tidier, more tucked-in saddlebag installations.

It's not surprising, then, that Honda elected to introduce Pro-Link to the street-bike wars on the new GL500 Silver Wing and the redesigned CBX Six. Both are touring-oriented models and so are expected to deliver that difficult combination of a plush ride *and* adequate anti-bottoming with a sizable load on board. That's opposed to sport bikes, which demand suspension of a very high quality to preserve their racer-like handling but don't make such a wide range of demands. Undoubtedly, that's why all other street Hondas still have a conventional rear suspension—for now.

In its present form, Pro-Link offers even more advantages than the twin-shock version, one of them being that a single suspension unit mounted ahead of the rear wheel results in less swingarm flex and reduced unsprung weight. Pro-Link does have a bit *more* unsprung weight than Uni-Trak, which supports the weight of its shock with the frame, not the swingarm as on Honda's system; but Pro-Link is better in that unsprung respect than a Monoshocker and all conventional dual-shock designs. Further, Pro-Link fits into the scheme of "mass centralization," Honda's logical belief that concentrating as many components as possible as close as possible to the motorcycle's center of gravity allows better overall handling.

Numerous other factors speak either for or against Pro-Link depending upon the nature of the motorcycle. The concept is fully compatible with tall motors, for instance, because its shock rests in a vertical plane. Yamaha's Monoshock is virtually horizontal, though, and thus hinders its usefulness with tall engines. Neither Pro-Link nor Uni-Trak are on good terms with *long* engines, however. Both require additional room between the rear wheel and transmission, which is why Honda plans to use Pro-Link only on models that can afford a lengthy wheelbase. And while Uni-Trak is not conducive to allowing a low seat (its linkage needs plenty of "rocking room" up under the seat), Pro-Link *can* allow a lower seat height, as evidenced by the GL500, for all of its linkage is down at the level of the swingarm.

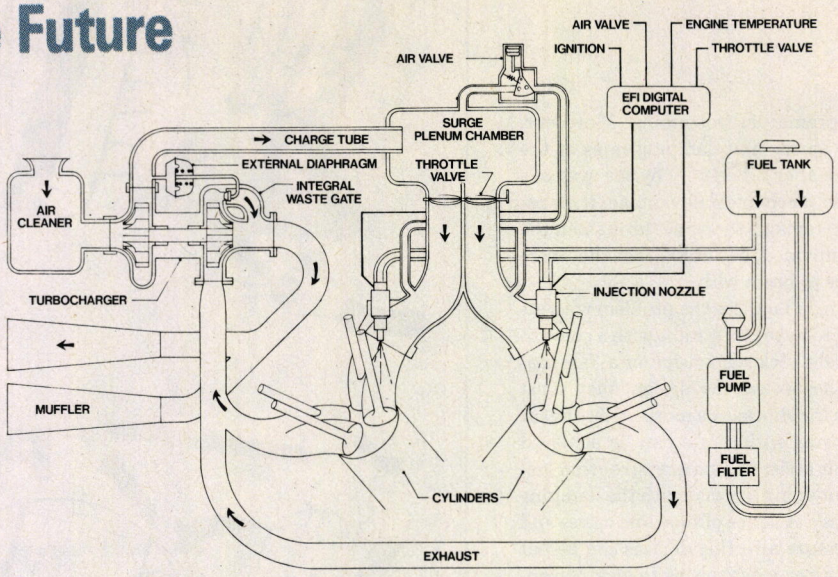
Nonetheless, fitting Pro-Link to any street motorcycle poses a problem with relocation of the usual under-seat components (battery, airbox, etc.). Which is why the GL1100 Gold Wing will never see this suspension. Its under-seat gas tank simply cannot be sufficiently reduced in capacity to make room for Pro-Link. Still, of all of the single-shock suspensions put into production so far, Honda's certainly seems the most compact and easiest to adapt to an existing street bike.

So maybe all Hondas won't someday use Pro-Link or something similar, but it's a good bet that most of them will. And don't be too surprised if many of those future models are virtually designed *around* Pro-Link. Because as the CX500 Turbo Tomorrowbike indicates, Honda thinks it's that important. —*Paul Dean*

Continued

Blueprint for the Future

Adapting the CX500 engine to turbocharging required several design features due to the motor's small displacement and vee-twin configuration. The IHI turbo creates boost at a low 2500 rpm because of its unique compressor-wheel design and small A/R ratio. Electronic fuel injection monitors engine conditions in order to deliver the correct fuel/air mixture despite variations in intake pressure. Keys to injection system are the extra large plenum chamber, which insures an adequate supply of air for good throttle response, and a hi-tech air valve, which aids accurate metering of fuel despite variable intake pulses of the vee-twin engine. Don Fuller's speculative drawing is based upon information provided by Honda and other sources.



The Selling of Turbocharging

• The motorcycle industry's visionaries already know that turbocharging has a bright future. What they don't know, however, is whether the turbobike should become a Buick or a Porsche, a fuel-efficient workhorse or a high-performance ass-kicker. And in fact it was this issue—the selling of turbocharging—and its implications that likely was discussed at the meeting between Honda Research and Development-Asaka directors and Honda Motor Company, Limited representatives just two weeks before the Cologne show, the meeting where the decision to unveil the first experimental Honda motorcycle to the public was made.

The technological advantages of turbocharging are well understood by Honda, of course. Honda R & D Managing Director Syoichiro Irimajiri has pointed out several times in the last year that smaller, lightweight engines offer the only realistic alternative for increasing motorcycle fuel economy. And in order to maintain performance comparable to today's powerplants, two choices are open: high-revving engines like the NR500's or turbo motors. While work on cam-chains for high-rpm engines continues, turbo technology is already a known quantity.

The question Honda had to discuss before Cologne, then, was how to make turbocharging acceptable to the people who buy motorcycles. After all, the first production turbobike will prepare the way for all blower-bikes to follow. That's why Honda representatives emphasize that the CX500 Turbo is an experimental exercise meant to test the waters. This controversy has not been resolved so far, but the limits of the discussion are pretty well defined.

First of all, Honda does not regard the turbo as a device that will extend the motorcycle's performance envelope—that is, turbobikes should not exceed what Irimajiri regards as the outer limits of acceptable street bike performance: 12.0-second quarter-miles, 125-mph top speed. Instead, Honda wants people to think of turbocharging as a way of beating the system. As American Honda's Ikuo Shimizu comments, turbocharging is a new feeling, "not massive performance, but still distinctive, still good performance." There is no room for blown ballistic missiles in Honda's philosophy.

In addition, Honda also wants people to understand that turbocharging doesn't improve fuel economy (just the opposite, in fact), despite the double-speak of automotive advertising. Turbos just give small engines the same high-performance potential as big ones, thus making relatively fuel-efficient engines acceptably rapid. Turbocharging affects performance, not fuel economy.

Honda also wants to get a better grasp on the marketplace's response to turbos. It vastly overestimated the sales potential of the CBX precisely because it vastly *under*-estimated the impact the bike's cost and complexity would have on the average rider. In the same way, turbocharging could take motorcycle technology too far, too fast. Also, Honda needs the same understanding and sympathy for turbocharging from its dealers as it does from its customers.

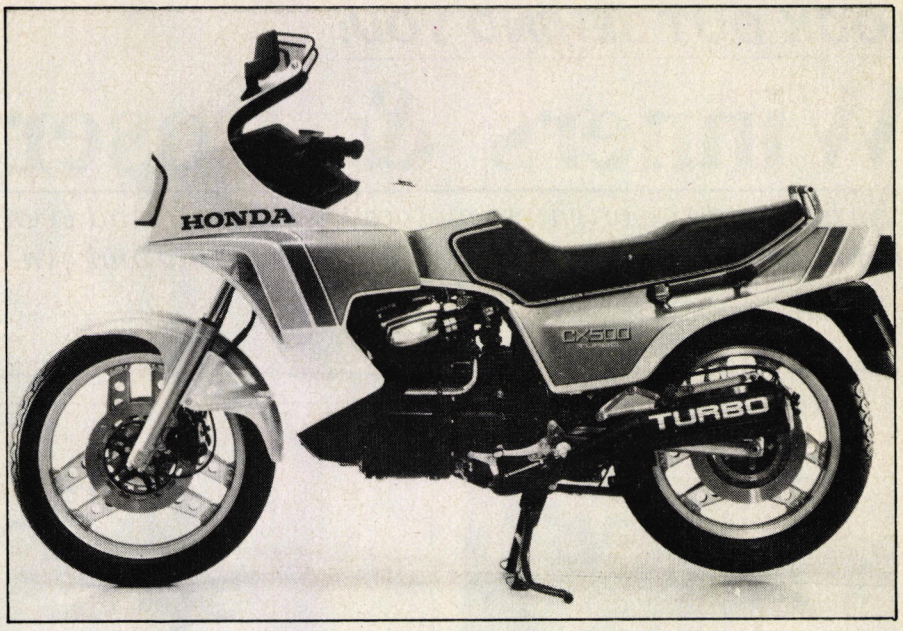
The choice, then, is whether to present turbocharging as something no more hi-tech than a hood ornament, the way that American car manufacturers like Buick have, or to use its high-performance implications to generate excitement. The CX500 Turbo assumed a racy, high-profile image only because it's very much an engineer's project, emblematic of what Irimajiri calls "The Challenge to the New"—a dramatic, forward-thinking example of Honda's search for improved motorcycle engineering. But that does not mean that a motorcycle like the CX500 Silver Wing might not be a better choice for the turbo láder in the long run.

As it turns out, response to the CX500 Turbo has been extremely positive from the beginning. The heat of flashing photographic strobe lights threatened to melt the bike's paint at Cologne, while American Honda's dealers appreciated the bike's nuances at their 1980 dealer convention.

It could be, therefore, that the crisis in the selling of turbocharging is already passed. The automobile companies have done the groundwork, helping motorcycle riders in this country understand that a turbo provides a way to sidestep the emissions and insurance penalties for big bikes without giving up any speed. That's why CYCLE GUIDE believes that the Turbo CX is very close to production now. Indeed, it makes sense for Honda to lead with both a Buick *and* a Porsche incarnation of the turbobike. We put our money down on 500cc, lightweight turbobikes in the October issue, and it appears that Honda has taken the trouble to build a motorcycle to our specifications. And nothing could be closer to our fantasy specs than a double-barreled blast from Honda for 1982—CX500 Turbo and Silver Wing Turbo. The selling of turbocharging has already been done. It's time now to get on with building the bikes.

—Michael Jordan

Honda CX500 Turbo



SPECIFICATIONS:

MANUFACTURER: Honda Motor Co., Ltd.
27-8, 6-chome Jingu-mae
Shibuya-ku, 150 Japan

CATEGORY: street

SUGGESTED RETAIL PRICE: N.A.

ENGINE

Type ..... turbocharged four-stroke transverse vee-twin
Valve arrangement ..... pushrod-operated overhead valves, four valves per cylinder
Bore and stroke ..... 78.0mm x 52.0mm
Displacement 496.9cc
Compression ratio 8.0:1
Carburetion ..... Nippondenso electronic fuel injection
Air filter ..... disposable paper
Lubrication ..... wet sump
Starting system ..... electric only
Ignition ..... solid-state CDI
Charging system .. 12-volt; alternator, voltage regulator, rectifier

DRIVETRAIN

Primary drive ..... straight-cut gears
Primary drive ratio 2.242:1
Clutch ..... wet, multi-plate
Driveshaft-to-rear-wheel drive ..... spiral-bevel gears
Driveshaft-to-rear-wheel ratio 3.09:1

Gear	Internal gear ratio	Overall gear ratio	MPH per 1000 RPM
I	2.73	18.92	3.9
II	1.85	12.82	5.7
III	1.42	9.84	7.4
IV	1.15	7.97	9.2
V	0.93	6.44	11.3

SUSPENSION/WHEEL TRAVEL, IN.

Front ..... air-spring 35mm stanchion tube diameter/6.3 in. (160mm)
Rear ..... air-spring 4.6 in. (118mm)

BRAKES

Front ..... dual single-action twin-piston hydraulic calipers, 11.0-in. (280mm) discs
Rear ..... single-action twin-piston hydraulic caliper, 11.8-in. (300mm) disc

TIRES

Front ..... 3.25V19 Bridgestone Mag Mopus S703
Rear ..... 4.00V18 Bridgestone Mag Mopus G504

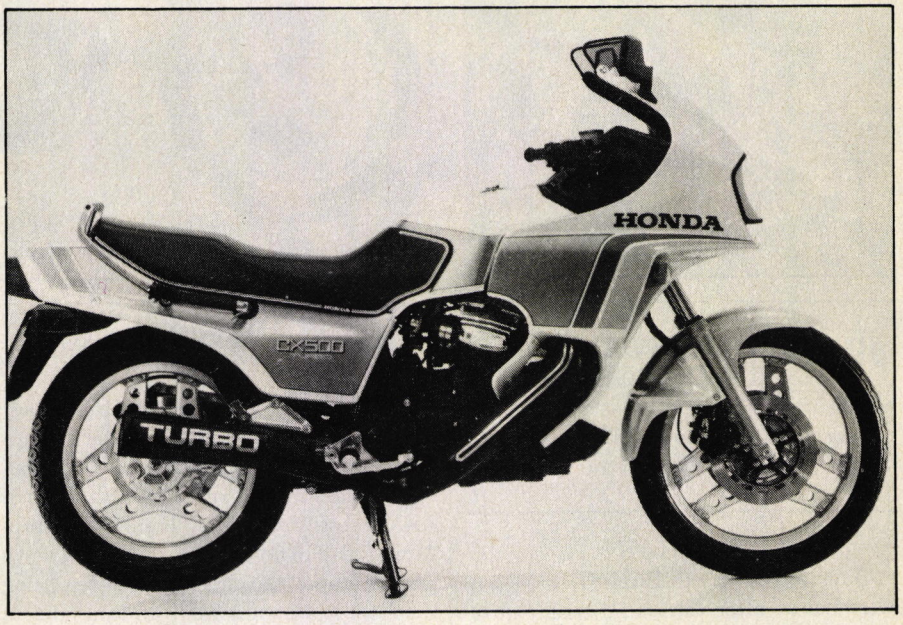
DIMENSIONS AND CAPACITIES

Weight ..... 485 lbs. (220kg)
Gross vehicle weight rating (GVWR) ..... 1055 lbs. (478kg)
Wheelbase ..... 58.8 in. (1494mm)
Handlebar width ..... 27.0 in. (686mm)
Frame ..... pressed and tubular mild steel, no front downtubes
Oil capacity ..... 3.2 qt. (3.0/)
Instrumentation ..... tachometer, speedometer, odometer, tripmeter resettable to zero, fuel gauge, temperature gauge, boost gauge, digital clock

WARRANTY: none

AVAILABLE COLORS: white with bronze/white with gray

All weights and measurements are taken with machine unladen and fuel tank empty.



COMPARATIVE TEST DATA:

Make	Quarter-Mile, sec/mph	Top Speed, mph	Weight, lbs	Price
Honda CX500 Turbo (est.)	11.93/119.2	NA	487	NA
Suzuki GS1100ET	11.43/118.3	140	540	$ 3669
Porsche 924 Turbo	16.0/88	131	2780	$21,760
Pontiac Trans-Am Turbo	16.7/86	116	3717	$ 9000
Porsche 930 Turbo ('79)	13.9/102	153	3040	$44,265
Honda CX500 Custom ('79)	14.21/92.9	102	468	$ 2498

LOOK OUT BEHIND YOU:

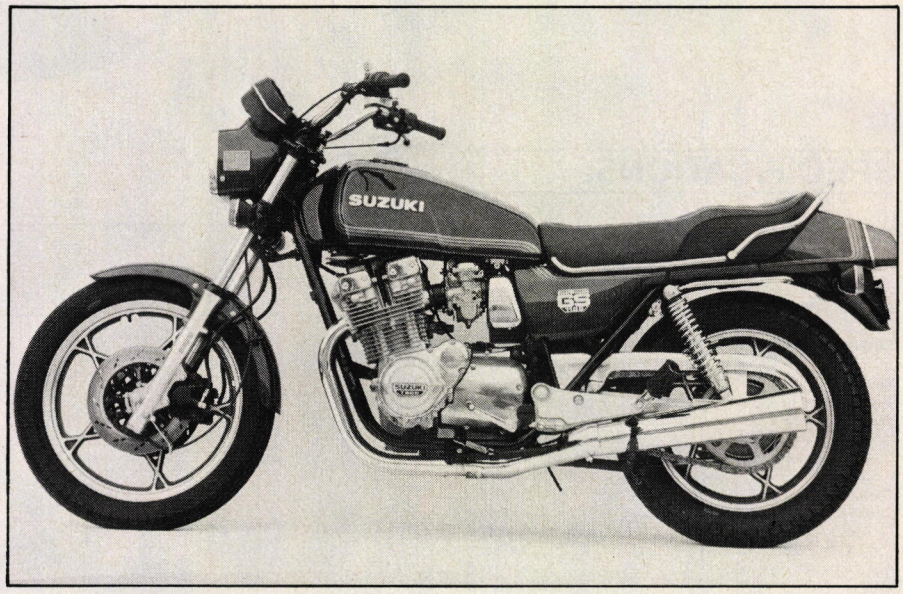
Winners & Losers 1980

The best and the brightest motorcycles, people and events of the past year, including a full measure of snarky back-biting and cynicism.

BY MICHAEL JORDAN

GREAT LEAPS FORWARD

• Yamaha YZ465. Suzuki GS1100E.

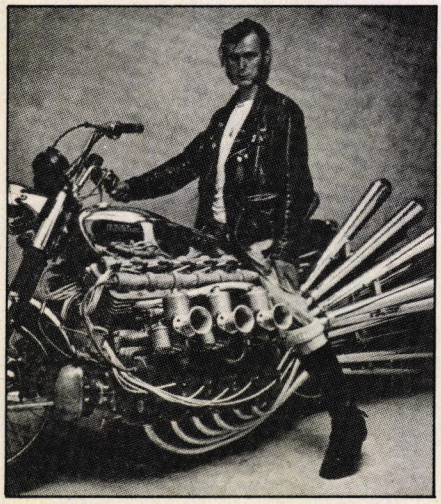


RUMORS OF ITS DEATH ARE GREATLY EXAGGERATED

• The Italian cottage industry produced an acronym-of-the-week motorcycle, the TGM 125 MXer, that won the Italian GP.

THEN AGAIN . . .

• Plans for the Moto Buzzi CV4600X-16 were halted after valve-adjustment problems proved insurmountable.



HEY EVEL, WANT TO BE ON TV?

• A television show goaded stuntman Gary Wells into emulating Evel Knievel's ramp-to-ramp jump over the fountain at Caesar's Palace in Las Vegas—with the same disasterous results as Knievel's jump. Wells failed to note that the same TV show put his stunts into perspective by featuring a school bus leaping ramp-to-ramp over a bunch of motorcycles a couple weeks before his own stunt.

MISSING IN ACTION

• Yamaha R5/RD350/RD400, 1970–1979.

YOU READ IT HERE FIRST

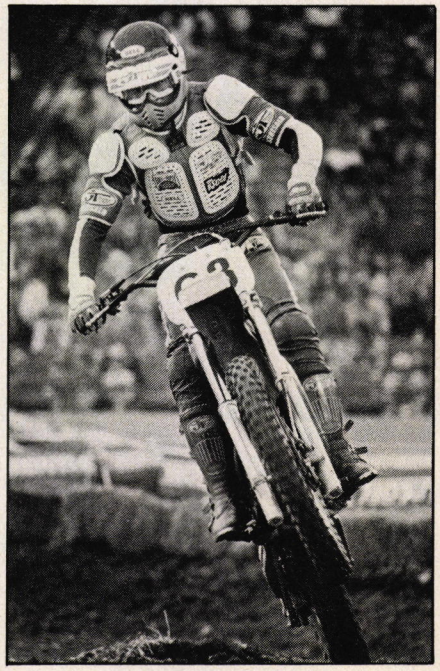
• Guide Lines predicted the Honda Turbo CX, Suzuki GS650 Shaft, Yamaha 550 Seca, Can-Am 500cc single, Honda CBX Pro-Link sport tourer, watercooled Honda CR250R and Kawasaki KZ1100 GP.

BUT DON'T BELIEVE EVERYTHING YOU READ

• Guide Lines also predicted a Honda CX550, a Kawasaki 250cc roadracer with belt drive, a Yamaha SR500 Monoshocker, a Honda 400/4 and a Moto-Guzzi V-6.

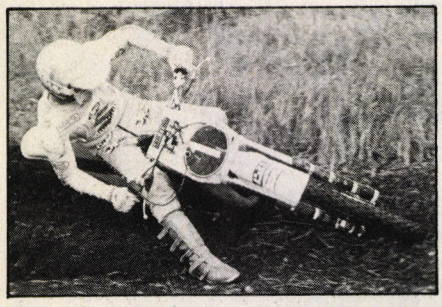
RISING STAR, MOTOCROSS

• Chuck Sun, who attracted attention as Honda's first National motocross champion in years despite being intelligent, soft-spoken and polite.



DON'T TREAD ON ME

• Johnny O'Mara, Kent Howerton and Marty Moates swept the motocross USGPs, rewarding CYCLE GUIDE's jingoistic drum-beating about the talents of American dirt riders.



PEDAL FASTER OFFICER

• The California Highway Patrol drew crocodile tears from bikers everywhere by complaining that its new Dodge St. Regis patrol cars couldn't top 92 mph even with speed-sapping light bars removed.

THE MUHAMMAD ALI AWARD

• To Mike Bast, who retired from speedway. To Russ Collins who unretired from dragracing.

MARKETING COUP OF THE YEAR

• Release of the Russian-built Dneipr sidecar in the U.S. before the Chinese could announce its Yangtze sidecar—both of which are ripoffs of a Thirties-vintage BMW rig.

WHERE ARE THEY NOW?

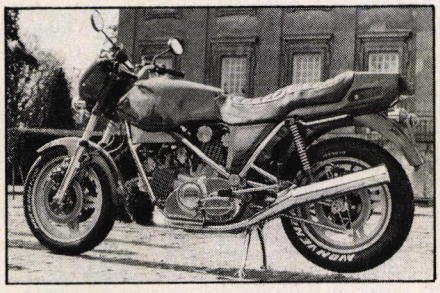
• Jimmy Weinert, Virginio Ferrari, Skip Aksland, Carter Alsop.

BOB WHO?

• Kent Howerton won the 1979 250cc USGP, the 1979 AMA Supercross championship, the 1979 Trans-USA, the 1979 Superbikers, the 1980 AMA 250cc National championship, the 1980 250cc USGP and the 1980 Trans-USA.

THERE WILL ALWAYS BE AN ENGLAND

• Well, maybe not. Yamaha halted sales of its SR500 Gold-Star clone in England because of poor sales. And BSA proposes to build a new street bike using a Yamaha XS650 engine.



THEN AGAIN . . .

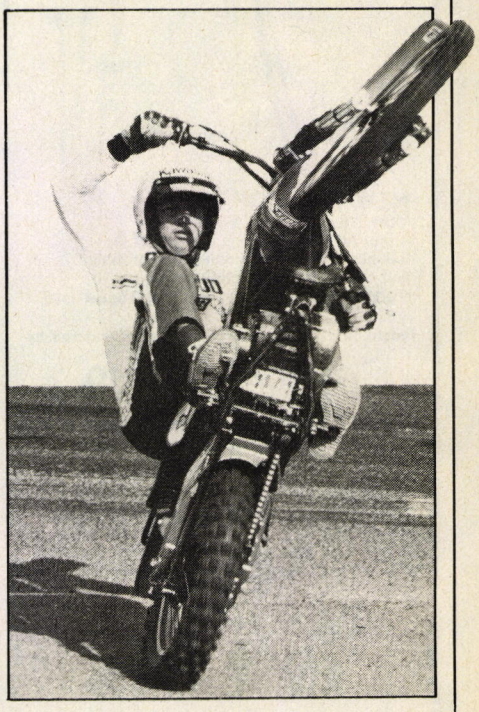
• The Hesketh Vee-Twin was announced by Lord Hesketh in March. And despite rumors of handling problems, stock in the corporation established to produce the bike sold out virtually overnight.

BAD NEWS

• According to NHTSA, average medical costs for a motorcycle-related injury amount to $11,038.

THERE'S A REASON THEY CALL HIM THE KING

• Kenny Roberts won the 1980 Houston TT, his first race on an American dirttrack since the 1977 season.



THE AMERICAN DREAM

• Doug Domokos set a new world's record for wheelies, riding 20 miles through the streets of Philadelphia on the back wheel of his Kawasaki KX250.

SANTA'S BEEN TOOLING AROUND

The precision **RatchLok** is made specially for the motorcyclist. Unique RATCHET ACTION, POSITIVE-LOCK jaws grip on four sides of a hex. **No slip** under 150 ft./lbs. torque! **No jaw serrations** to mar special **chrome, brass** or **aluminum** custom finishes. ADJUSTABLE **RatchLok** replaces metric and standard wrenches. Dozens of tools in one, versatile **RatchLok** is just what motorcyclists need to protect super-clean finish. **Ideal for road riders**, the **RatchLok** replaces bulky tool kit with just one tool!

Get a RatchLok for Christmas

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- **RATCHET ACTION**-features ratchet capability on fittings from 3/8" to 1" which allows it to be used like a complete set of sockets. Reduces installation time.
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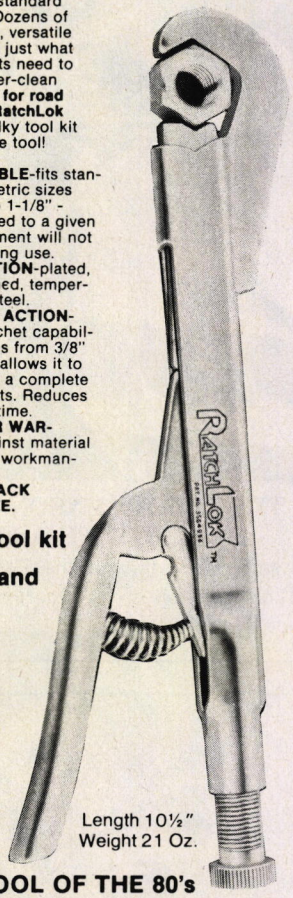
- **MONEY BACK GUARANTEE.**

½ your tool kit in one hand



Length 10½"
Weight 21 Oz.

NEW TOOL OF THE 80's

"Just like duct tape in the 1960s and Armor All in the 70s, one can expect the **RatchLok** to become a universally accepted part of the biker's equipment inventory."
QUOTE-CUSTOM BIKE magazine, August 1980.

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Expires _____

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Summit Tool Co., 4150 Fox St., Denver, CO 80216

STILL WITHOUT GAINFUL EMPLOYMENT

• Lynn Griffis returned for another tour of duty as racing's mother confessor on the Winston Pro circuit.

BEST STICKIE OF THE YEAR

• 1980 Vetter Rally.

YAMAHA SALUTES HONDA

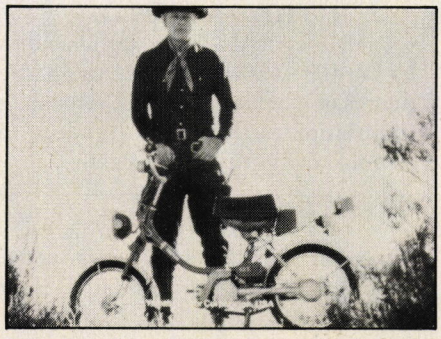
• For 1980, Honda ran a new corporate slogan up the flagpole, "Follow the Leader." Yamaha saluted with "Don't Follow Anyone."

A CRACK IN THE WALL

• The 1980 Republican party platform opposed the 55-mph speed limit.

TELEVISION PERSONALITY OF THE YEAR

• The man who made America love the Yamahopper, that two-wheel cowboy, Yama-Hoppy.



HIT-YOURSELF-IN-THE-HEAD-WITH-A-BRICK-BECAUSE-IT-FEELS-SO-GOOD-WHEN-YOU-STOP MEMORIAL-ICE-PACK-WITH-PREPARATION-H-CLUSTERS

• Awarded to Marco Gardoqui who rode his Derbi moped around the world in 76 days, including one non-stop ride of 36 hours.

POETIC JUSTICE

• Two Connecticut Harley-Davidson dealers began accepting automobiles as trade-ins on new Harleys, proving that Milwaukee iron is better than Detroit iron.

WINNER

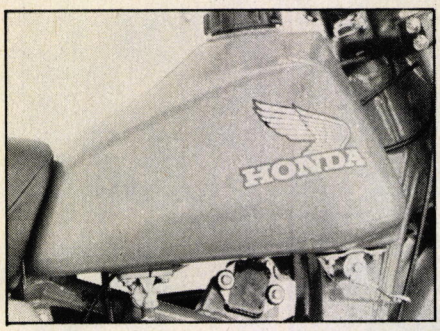
• Lynn Lynville, who won Harley-Davidson's "Just for Kicks" contest at Daytona Beach by kickstarting his '51 flathead 49 times in 60 seconds.

WHEN FAST ISN'T FAST ENOUGH

• The inability of the federal government to intimidate people intent on building fast motorcycles was revealed when Vance/Hines Racing, Blake Turbochargers and Nitrous Oxide Systems all announced hardware to make Suzuki GS1100s even more outrageously fast.

DUMB MOTORCYCLE NAME OF THE YEAR

• The Yak, a single-cylinder trail bike conceived by the Spanish Ducati licensee.

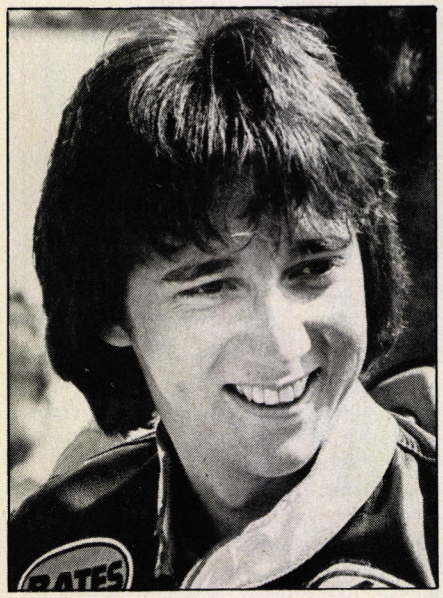


GLUEPOT AWARD

• To Honda motocross machines, thanks to the first tank decals ever to actually stay in place on a plastic gas tank for more than 20 minutes of riding.

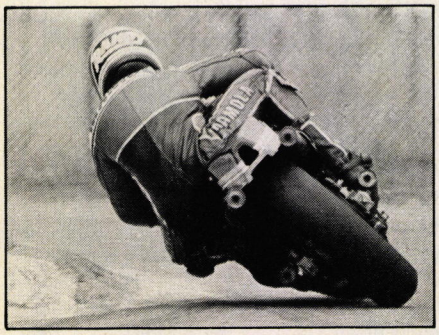
BRIGHTEST STAR, ROADRACING

• Freddie Spencer, who nearly won Daytona, dazzled the Limeys at the Match Races and gave the AMA Superbike series star quality.



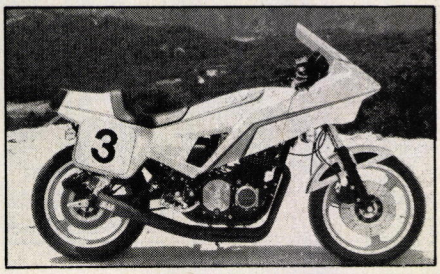
RISING STAR, ROADRACING

• Randy Mamola, who in his second year as a competitor on the GP circuit proved his ability to race head-to-head with Kenny Roberts.



AND ALL THE TIME YOU THOUGHT...

• For His new movie, *Oh God, Book II*, God rides a Suzuki sidecar instead of a Harley. Meanwhile, Pope John-Paul II responded to the gift of a very expensive automobile this year with the comment, "It's a lovely car—but I'd rather have a motorbike."



WHAT PRICE GLORY?

• For a mere $10,000 Craig Vetter would be happy to build you a Mystery Ship.

AWARD FOR JOURNALISTIC EXCELLENCE

• Given to Stephen Wright's book, *American Racer, 1900–1940*. Honorable Mention to Patrick Behar's story in the November 1980 issue of CG uncovering the origins of the faithful bungie cord.

GOVERNMENT BUREAUCRAT OF THE YEAR

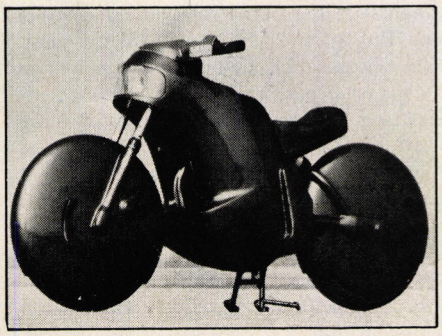
• Tom Lankard, California's Director of the Office of Traffic Safety, who rode a Kawasaki Dresser cross-country to the 1980 Motorcycle Safety Foundation's conference.

NEVER MIND

• Say, whatever happened to the amazing 23-inch front wheel anyway? And what about Claw-Action tires?

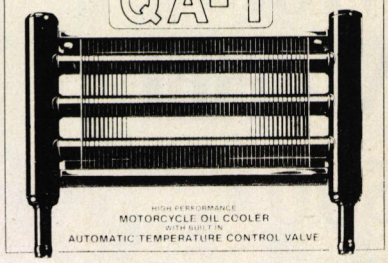
NO CHOCOLATE MESS

• Porsche Design whipped up the world's largest M&M for the Cologne Show by coating an SR500 with a thick layer of fiberglass.



DERALE
OIL COOLERS

QA-1



Model No.	Application	Sug. Ret.
	HONDA	
H-1T	500,550,750 PRE '79	$79.95
H-2T	750F '77-'78	$79.95
H-3T	650,750K-F, '79-'80	$79.95
H-4T	GL 1000, GL 1100	$79.95
H-5T	CB 400 T	$79.95
H-6T	ATC 90-110	$79.95
	YAMAHA	
Y-1T	XS 1100	$79.95
Y-2T	XS 750	$79.95
Y-3T	XS 650	$79.95
Y-4T	SR 500	$79.95
Y-5T	TT 500	$79.95
	KAWASAKI	
K-1T	KZ 900, 1000, ZIR	$79.95
K-2T	KZ 650	$79.95
K-3T	KZ 1000 ST/'79	$79.95
	SUZUKI	
S-1T	GS 550,750,850,1000	$79.95
S-2T	GS 1100	$79.95
	BMW	
B-1T	R75/6,R90/6,R90/S R75/7,R100/7,R80/7	$79.95
B-2T	R100/S	$79.95
	MOTO GUZZI	
M-1T	850-T3, GS 1000	$79.95
	HARLEY-BRITISH	
D-1T	650 AND UP	$74.95

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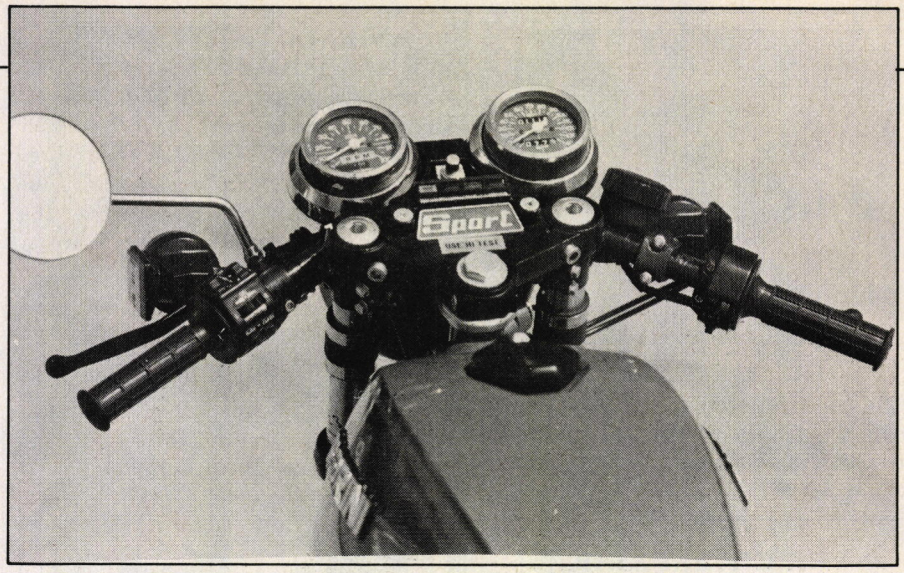
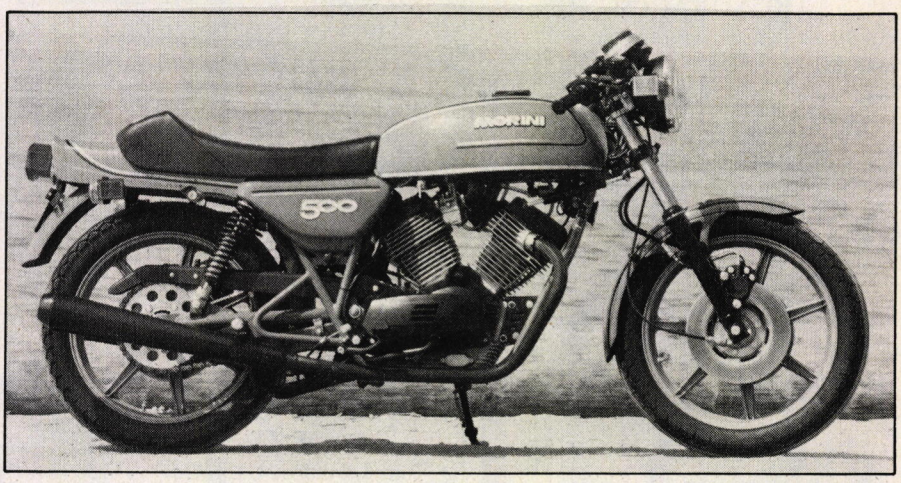
MINITEST:

Moto Morini 500 Sport

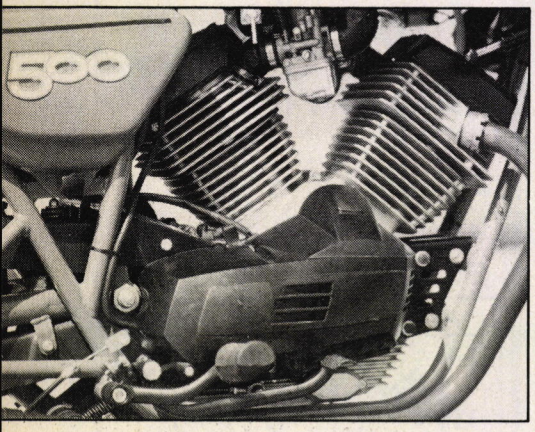
All the horsepower is in the chassis.





• From just about any angle, the Moto Morini 500 Sport looks fast. It casts a sleek silhouette against the horizon. The fire-engine-red paint shouts out that it is Italian. And everybody knows that Italians build only sleek, fast bikes.

But what the Morini Sport personifies while parked by the roadside doesn't necessarily reflect how it actually performs on the road. The 500 Sport isn't lightning-quick when it comes to fulfilling any of your time vs. distance fantasies. If it's speed you want, you've come to the wrong café. Instead, Morini has spiced its 500 Sport with good handling, the kind of handling that seems to be cradled within every Italian motorcycle made for high-performance street riding. Morini's 72-degree vee-twin engine nestles in a bright red double-downtube frame that doesn't flex or twist. The resulting rock-steady ride across the apexes is furthered by a taut suspension made for canyon-carving fun. The Sport won't suck you into a nerve-taxing workout with a headstrong machine that wants to go left when the road goes right.



Moto Morini 500 Sport's heart

Slow but steady pulse.

Still, you must keep one thing in mind when charting apexes with the Morini Sport: Never let up on the throttle. If you do, time suddenly stands still, and the apex you've aimed for up the road remains *up the road.* You learn to let the throttle-return springs do their job only when you want to come to a complete halt. Since the Sport writes poetry about Italian beauty and handling, and doesn't produce much in the way of horsepower from its two matte-black mufflers, you should consider it a profiler's motorcycle. Not the boulevard-cruising type, but the sort of profiler made for looking fast and dashing through the twisties.

Even with all the grace and beauty this bike boasts in the corners, though, your back won't be impressed. After less than 10 miles on the Sport you begin squirming on the hard, contoured seat in an effort to find the comfort zone. But you've been tricked—there is none, mainly because the clip-on handlebars set you in a racing crouch, while the non-folding footpegs from the garden-variety Morini 500 are positioned too far forward. As a result, the Sport's ergonomics require contortions that make you feel as if you've been stuffed fanny-first into a 55-gallon drum. In short, the Sport needs rearset footpegs.

No less subtle a proposition than the Morini's riding position is the clutch action, which is straight from the Stone Age of motorcycles. It exhibits all the finesse of a train wreck. When you engage first gear, the bike lurches forward, and if it doesn't stutter or stall, you can expect a mini-wheelie as the clutch finishes engaging. It's hard to be discreet about leaving the line when a comedy of errors threatens every time first gear is called into play.

Once you're away from the stoplight and gliding on tree-lined back roads, you eventually find the Sport's forte—precise and responsive steering. No matter what radius the turn, the Sport immediately takes the path you direct. Even with 29 degrees of rake—a dimension commonly associated with straight-line stability instead of quick reactions—the 390-pound Sport feels utterly agile when tossed from corner to corner. The relatively short trail—101mm—makes the steering feel light as well, adding to the bike's responsiveness.

Furthermore, the Sport's quick and obedient steering doesn't lead to the sort of jerky response common to bikes like the Yamaha RD400. When you commit the Morini's Pirelli Phantom tires to an arc, the bike glides through the turn as though it were intended to go through life with the horizon tilted at an angle—or at least it seems so until you touch hardware to the pavement. The Sport's cornering clearance is surprisingly limited, and you'll touch down easily on both sides—the right

footpeg in sharp corners, and the side- and centerstand in any kind of hard lefthander.

Your confidence in the Sport's ability to knife through a series of turns is further reduced by the small amount of horsepower that finds its way to the rear wheel. Handling certainly is this bike's mission, not acceleration, but the Morini still feels underpowered. Part of the lackluster performance can be traced to the carburetion. On a 10-point scale, throttle response is about a three. When you twist the right grip, you don't expect much, because it seems to take forever to relay the message to the engine. The two 26mm DellOrto mixers have been unmercifully strangled in order to meet EPA regulations, and so the engine stutters momentarily when you roll on the throttle. Once the engine catches its breath, it pulls steadily—and slowly—to the 7500-rpm redline in the lower gears.

Internally, the Sport's engine shares the same pieces as the Morini 500 tested in the January 1979 issue. The 479cc pushrod engine features Heron heads, in which the domed combustion chambers are scooped from the piston crowns instead of the cylinder heads. Although this design is intended to reduce production costs by eliminating machining of the heads, Morini engineers maintain it also aids fuel turbulence, improving combustion. The result, the factory claims, is good engine torque and improved fuel consumption. The Morini engine is a torquer all right, but unfortunately this test bike churned out only 44 mpg, not a stellar figure for a 500cc bike.

The Morini drinks premium fuel along the way because its compression ratio is a Sixties-vintage 11.2:1. As a result, if the engine rpm should drop too low, say below 3500 rpm, and you apply too much throttle, your ears are sure to be assaulted by the sound of rattling gravel that signals detonation. It's essential to use the five-speed gearbox to stay on top of the torque curve in order to avoid this pinging.

Still, the Morini's high compression ratio works to the bike's advantage in another way—it acts as a fourth brake to complement the three hydraulically actuated disc brakes. When you close the throttle, the Sport immediately decelerates. And the twin 10.2-inch Grimeca discs up front have no problem completing the stop. Unlike the positive feel you get from the front discs, though, the rear brake feels mushy, mainly because its actuating cable must stretch across the back of the engine from the DOT-mandated right-side pedal (the Morini engine was designed with its controls reversed) to the master cylinder on the left side of the frame. Consequently, there's a lot of slop in rear brake action, and you'll probably find the rear disc most useful to help stabilize the bike under strenuous braking—otherwise, you might as well leave your right foot on its footpeg.

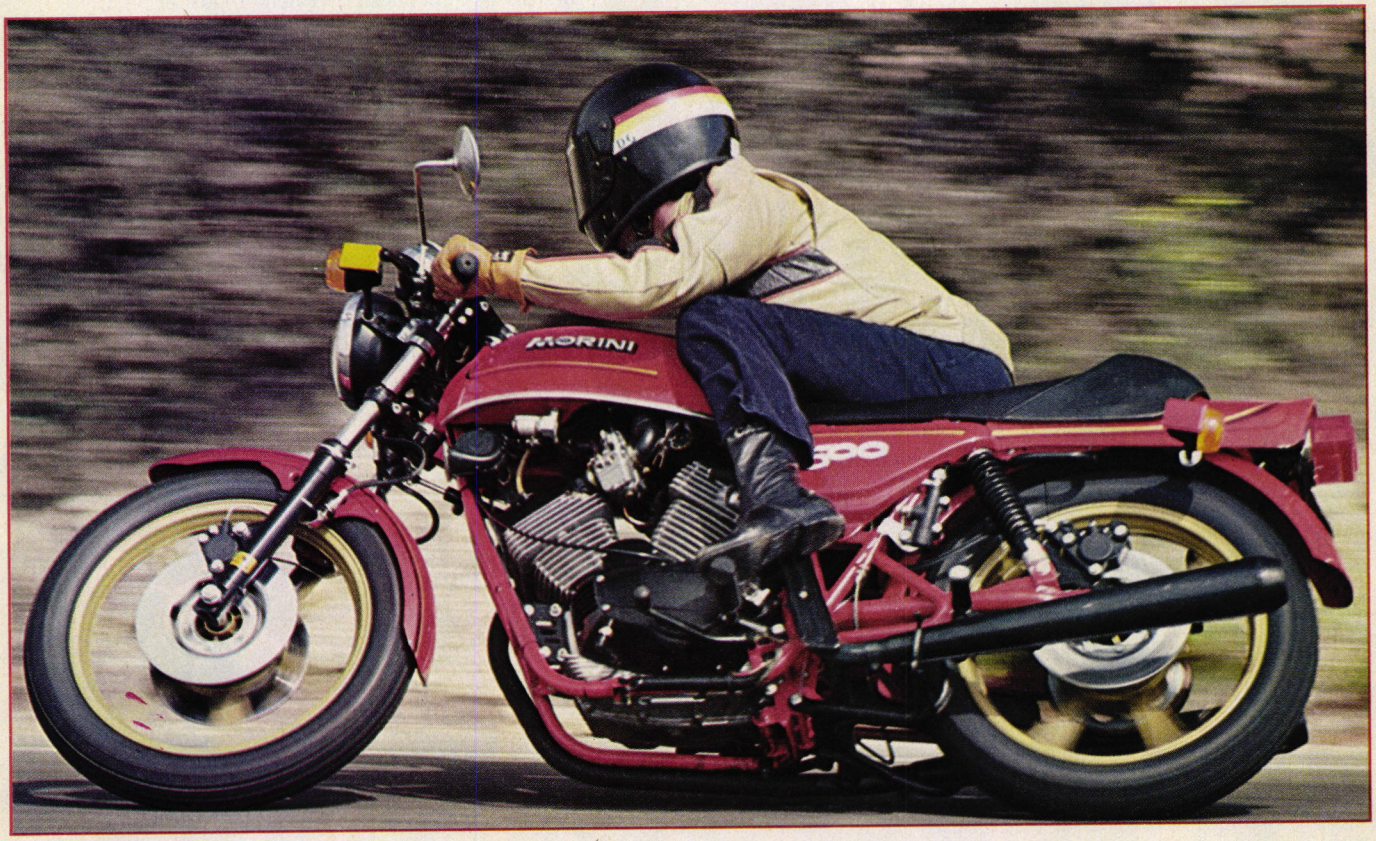
The Morini has one last idiosyncrasy to amaze you: reverse instruments. The Sport has a left-mounted tachometer while the optimistic 140-mph speedometer is on the right. The Veglia tach needle likes to quiver, making engine speed a guesstimation. But since you tend to rely on the vee-twin's staccato exhaust note and the crest of the torque curve to gauge engine speed anyway, just keep the torque on tap and you'll never have to refer to the tach except when operating near redline.

Riders willing to give the Morini Sport this sort of special attention will reap the rewards of owning a bike different from the rest of the four-cylinder middleweights that have multiplied like bunnies lately. But to anyone else, the Morini is simply an anachronism, a nightmare of the past with a profusion of electrical connectors and an ignition key that lives under the tank instead of on the dashboard. The Sport is so completely different from anything else on the road it's no wonder that you must be completely different from anyone else before you can appreciate it. —*Dain Gingerelli*

Moto Morini 500

IMPORTER: Slater Bros.
P.O. Box 746
Kenwood, California 95452

Category	street
Suggested retail price:	$3295
Engine type	four-stroke tandem vee-twin
Valve arrangement	pushrod-operated overhead valves
Bore and stroke	69.0mm x 64.0mm
Displacement	478.6cc
Carburetion	two 26mm Dell 'Orto slide/needle
Gearbox	5-speed
Front fork/wheel travel	36mm stanchion tube diameter/5.8 in. (147mm)
Rear shocks/wheel travel	4.1 in. (104mm)
Wheelbase	56.8 to 57.8 in. (1443 to 1468mm)
Seat height	30.3 in. (770mm)
Weight	390 lbs. (177kg)
Best ¼-mile acceleration	15.503 sec., 82.94 mph (133 kph)
Top speed (calculated)	120 mph (193 kph)



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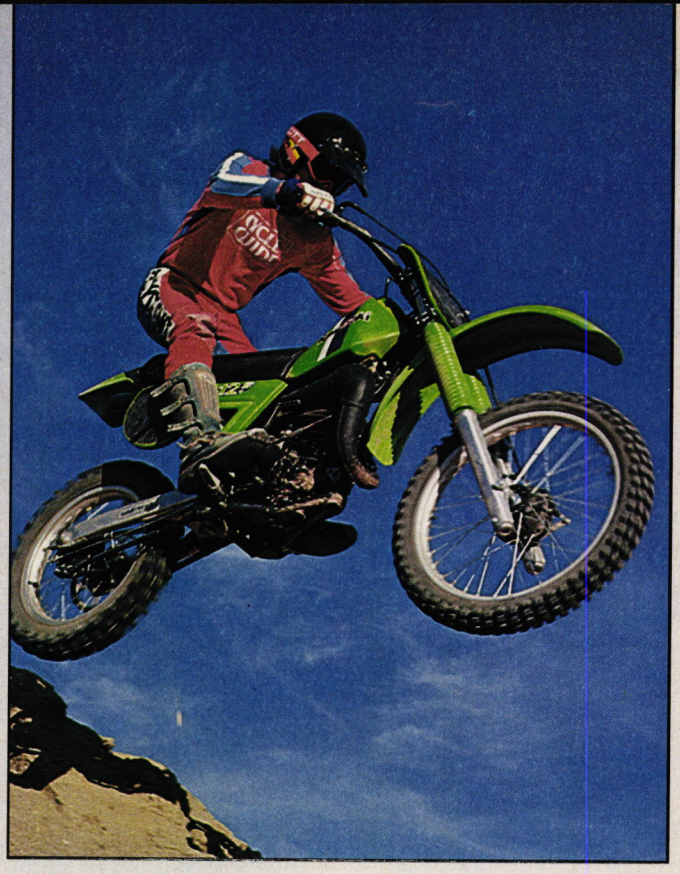

TRACK TEST:

Kawasaki KX125

High and dry in a pool of waterpumpers.

BY DAVID DEWHURST

Quarter-liter motocross is intensely competitive. Whether deep in the first turn or out on the sales floor, little separates a winning bike from the losers. Sometimes all it takes is a unique sales feature or even some little gimmick to convince everyone that one bike has a tiny edge over the opposition.

Kawasaki certainly had *the* unique sales feature in 1980 with its Uni-Trak suspension. Its upright single shock marked the crest of a growing wave of radical rear suspensions. The KX125 had plenty of other factory-bike licks that helped bolster its appeal further, but it had one disadvantage: no horsepower. Once off the showroom floor, the single-shock concept, no matter how well it worked, was hidden by the roosts of other motorcycles.

Ironically, the new KX is still a unique motorcycle, but probably not in a way that Kawasaki is keen to shout about. The KX does not have the finless barrel of its factory cousin and every other Japanese 125cc production motocrosser on the 1981 market—in short, the KX lacks watercooling. It still has single-shock suspension, but now so does every other serious contender in the 125 class.

So Kawasaki's KX125 A7 starts the 1981 sales season with a big deficiency in sales features, but Big K engineers feel that on-track performance will more than compensate. They pin their hopes on a radically new motor along with improved suspension. With these features, coupled with detail changes in many areas, Kawasaki hopes that the green fist will punch the wind out of the competition's sales.

Kawasaki has a lot of ground to catch up before its fighting attitude can be successful. Traditionally, the Green Giant has

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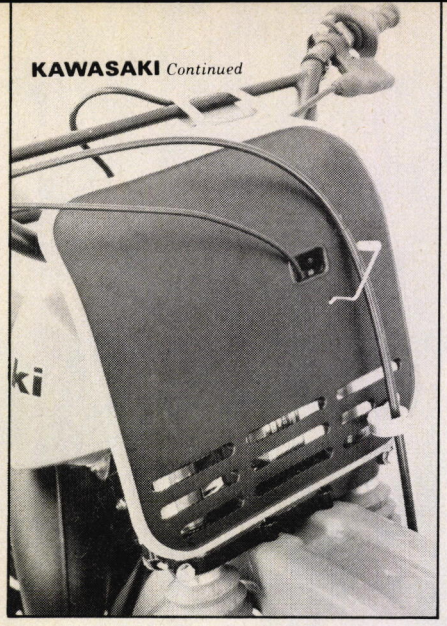


always been half a step behind the opposition. Sometimes it has had the chassis, or the motor, or the suspension, but rarely have all three been included in the same racing package. Last year the little 125 had a unique and revolutionary suspension that put the motocross world on its ear. Unfortunately, in trying to develop three radically new motocross models in a very short time, some important things were left out of the Uni-Trak setup. Kawasaki is using 1981 to correct the problems and omissions, hoping its new baby will finally develop into a mature motocrosser.

Growing up meant cutting a few sharp teeth in the motor. But with such a slow 1980 engine, the design team had its work cut out for it. As it turns out, the search for speed called for so many changes that virtually all that remains of the A6 design are crankcases and gear internals. Everything else is new, from the crankshaft to the more radical barrel.

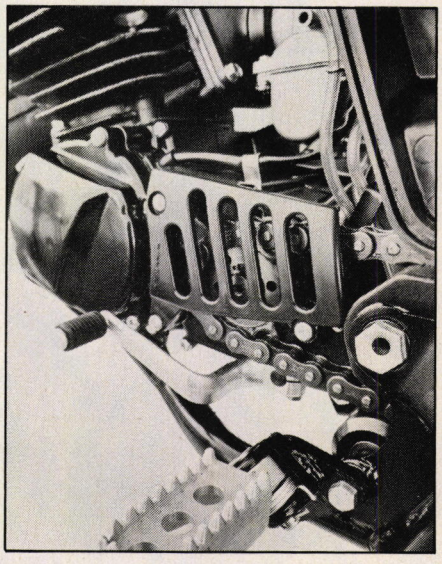
The cylinder's swept surface is still Electrofusion-coated, but there the similarity to last year ends. In the quest for more power, the transfer ports open 1.5 degrees earlier than before, yet the exhaust is three degrees *less* radical. On the other hand, the exhaust window is much, much wider—so wide, in fact, that it now has a bridge in the center to prevent ring snagging. The "eyebrow" of the port is actually 8mm wider and there is also 3.5mm less metal at the bottom of the port.

Once that far, the designers could not stop. They were committed to more power and so looked everywhere for it. First they redesigned the exhaust system, making the mid-section fatter. Then they replaced the 32mm Mikuni with a 34mm version that has no idle speed adjustments. And to help all this work together, the design team threw in an ignition advance curve that allows the motor to rev higher. All of which, Kawasaki claims, bumps up maximum horsepower eight percent and shifts the power peak an amazing 2000 rpm higher to 12,000 rpm. The changes to the engine do not stop there, either. Compression is upped a fraction and the full-circle crank used in 1979 is back in place of last year's shaved-down pattern. And to absorb all that extra power there is a set of aluminum clutch plates feeding the gearbox which worked so well last year.

The rear suspension also worked very well in 1980, but it has received some subtle changes, anyway. The first job was to increase the strength of the Uni-Trak links that connect the swingarm to the rocker arm under the seat. More significant is the new aluminum-bodied shock with a steel reservoir. This change may not sound too drastic, but it is important. First, this design sheds a lot of weight, which is critical in 125cc motocross where every extra pound can add a fraction of a second to lap times. Even better is the ease with which suspension changes can now be made. It is still best to remove the shock to alter the 15mm of preload adjustment, but four damper settings are now available at the flick of a wrist. A knurled adjuster sits just below the top mounting eye of the shock on the right side of the motorcycle. It can be reached without even removing the sidepanel, which is a pleasant change from last year when the shock had to be taken from the frame and the spring taken off before adjustments could be made.

Clicking to the extremes of the new damping adjustments does not reveal a very wide range, but fortunately all four settings are well within the motocross ball park. The same is true of the new rear spring, which retains the same spring rate as last year but uses smaller wire diameter and fewer coils to save weight.

So the KX125 should feel very similar to the 1980 model, and it does. Everyone who rode the bike agreed that the suspension worked fine. No matter where the preload or damping was set, the KX would glide over just about anything. In fact, the Kawasaki seemed to work better on rougher tracks than it did on smooth surfaces. When the whoops got as tall as most other 125cc motocrossers can stand, the Green Meanie felt right at home. Throw the Uni-Trak at the worst washboard or the deepest sand and it works as well as most current production suspensions. On smooth tracks the KX is a fraction harsh, however, no matter how little preload is used. This is probably a result of retaining a straight rate spring on a non-rising-rate suspension. For 1981 Kawasaki has equipped its



Aluminum footpegs and shift lever

Forgery is better than original steel.

bigger bikes with dual-rate springs, but the 125 still has a single rate spring, presumably for reasons of cost.

Money was no object at the front end, though, where the KX uses a new fork slider with larger oil capacity and better anti-stiction bushings. Last year's twin metallic bushes have been replaced with three split teflon versions which reduce stiction even more. And with 30cc more oil in each leg, the fork should run a few degrees cooler at the end of a long moto.

The rider is going to feel pretty cool and fresh too, because the combination of good rear end and improved front end really make racing a pleasure. The KX will crash into holes and ledges without twitching, which may be due in part to the strengthening of the frame around the swingarm pivot. Other than that, the chassis is unchanged from last year, but the extra rigidity seems to help handling, as well as reducing the prospect of frame breakages.

So last year's suspension gimmick really has matured into a proven performance feature. But no matter how well a motorcycle handles, if it does not have a competitive motor it will not win races. And when riders look at the KX's finned barrel, they will wonder if everyone else's watercooling gimmick is going to blow Kawasaki away. Unfortunately, they are pretty close to the truth. The motor *is* considerably faster than last year, but it needed to be simply to keep up with *last* year's opposition. And so the KX125 would stay with just about any other 1980 air-cooled bike we pitted it against. In a series of races with a 1980 CR125, the KX would hold its own. But when put against a water-cooled Mugen, which more accurately represents the water-cooled bikes the KX will meet in 1981, it was blown away. The new Kawasaki motor, for all its extra power, did not have the sheer horsepower or the broad powerband to stay in the hunt. It does not matter if the KX handles better; if it does not have the right kind of power, it cannot win the dragrace to the next turn.

More importantly, what power the KX engine did have soon went away in the heat of battle. The little air-cooled barrel would get so hot that it would distort and the engine would lose power more quickly than any other motorcycle motor we have tested. After eight hard laps, the corners did not seem to rush up as quickly as before, no matter how hard we tried. And when we tried really hard, we seized the motor at the new exhaust bridge.

The engine was well within operating tolerances before seizing, so it would appear that in its latest form the little KX motor is running on the ragged edge of its thermal limits. Which only goes to suggest that, despite Kawasaki's claims, such a highly tuned 125cc motocrosser really *does* need watercooling. Just like Uni-Trak suspension, watercooling is a sales feature that really can work after all.

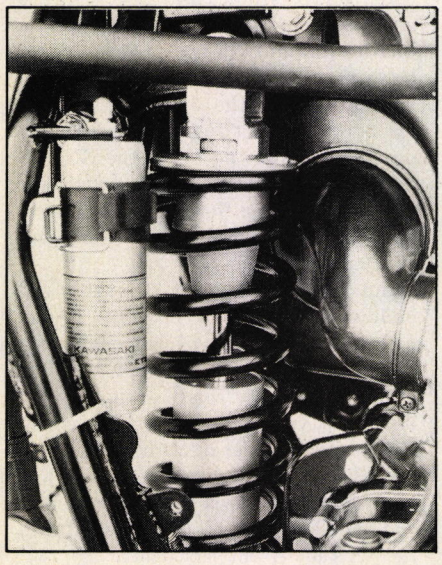
But even if the Kawasaki did not lose power, it still would have a hard job staying with the opposition. In the full-throttle drag to the first turn, the Green Meanie will probably hold its own. But from there on it is racing out of its depth. The very first turn will show you why. Pitch the bike sideways and downshift a couple of times and things are fine, but if that guy in front gets in your way, you are stuck. The moment you back off and use anything less than maximum rpm, the Kawasaki will be smoked. It simply has too narrow a powerband.

Now, a narrow powerband would be all right if the motor made killer horsepower. You can often sacrifice one for the other. But the KX has neither. Back off just once and life gets a giant holeshot on you. It may be possible to stay with the new breed of water-cooled 125cc motocrossers on a KX, and you may even be able to win. But if you do, it is you that has done the winning and not the Kawasaki.

To illustrate that point we matched the KX against a 1981 KDX175. The enduro model does have a capacity advantage on the 125, but in theory that is all. It has an older chassis, less sophisticated suspension, wider ratio gears, a heavier flywheel and more weight overall. Yet the 175 enduro could beat the KX125 on a motocross track. Even without the advantage of the latest suspension or chassis technology, the more predictable motor of the 175 made all the difference for the KDX and try as we could, riders on the KX125 could not get past the enduro.

And that makes us wonder why a company that builds such a good 175cc enduro motor cannot build a competitive 125cc motocross engine. In its present form the KX125 A7 would have been a tough contender in 1980. But even if it can retain its power, the Green Meanie will probably get drowned by the current tidal wave of today's waterpumpers.

So Kawasaki starts the 1981 season with a deck stacked heavily against itself. Low price is the only ace up the corporate green sleeve, but that may not be enough. What Kawasaki needs is either better engine performance or a workable sales feature to win racers over. And without both, the KX won't be able to radiate much excitement. •



Easily adjustable aluminum shock

Tuning in to your favorite setting.

Charting the Changes

Engine: Return to 1979-style full circle crank in place of semi-circular version. Exhaust port duration reduced six degrees but widened 8mm at top and 3.5mm at bottom with added bridge. Transfer port duration increased by three degrees. Longer advance curve on CDI ignition and a 34mm instead of a 32mm carburetor. The exhaust pipe is increased in volume. Compression ratio raised 0.1 to 7.7:1. Clutch plates are now aluminum and the ignition sidecover is redesigned in aluminum.

Frame: Stronger swingarm pivot mount. Stronger brake pedal stop.

Suspension: New rebuildable aluminum shock with externally adjustable rebound damping. Remote reservoir is steel and has air fitting. Rear spring has the same rate as before but uses a smaller wire diameter and fewer coils. Uni-Trak links are stronger. Front fork has three teflon bushings in place of two metal bushes and fork oil capacity is increased 30cc.

Tires: Bridgestone M17 and M20 tires replaced with M27 and M22 on new DID rims.

Details: Smaller air filter now breathes through its entire surface area. Swingarm and rear axle bolts are hollow. Footpegs and shift lever are forged in aluminum. Square AMA-approved number plate is painted black. KX logo is stenciled in green on the seat. Final drive sprocket increased one tooth to 53.

Continued

Kawasaki Makes It Simple

• Kawasaki figures that too much of a good thing can be bad for 125 motocross riders. Alone of all the manufacturers of 125cc MX bikes, Kawasaki has decided watercooling is unnecessary on its production bikes. On its works racers, Kawasaki believes watercooling is essential, but it regards production bikes as completely different.

Basically, Kawasaki has refused to follow the other 125 MX-bike manufacturers on the road to increased complexity and cost. Even though Honda, Suzuki and Yamaha will tell you that watercooling is just as essential on a production bike as a works racer, Kawasaki thinks there are other issues that need to be discussed, no matter how eagerly other companies will point to the resemblance between their factory and production machines.

As close as production and works bikes might resemble one another cosmetically, Kawasaki engineers maintain, production bikes resemble factory one-offs neither in performance nor in clientele. Watercooling benefits extremely fast riders in 40-minute motos, not the weekend hotdog in a 15-minute heat. And this, Kawasaki says, is why production Green Meanies are aircooled, no matter how many green, water-cooled, 125cc works racers you've seen or what you might have heard about Lackey's experimental aqua-250 MXer.

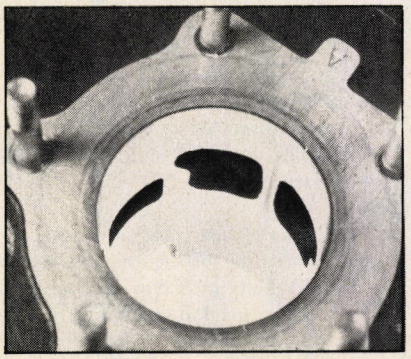
Furthermore, Kawasaki very deliberately wants to turn away from the escalating costs and complexity of racing 125cc motocross bikes. The additional pieces required by watercooling raise the price of motorcycles that are already priced out of the average rider's reach, while the maintenance problems tax his limited talent with a wrench. Kawasaki wants you to remember that 125 riders are very young, with neither the financial nor technical skills to support the extraordinary technology they've been given. Indeed, this is a very real issue to all manufacturers of 125s, one of which considered doing away with its air-spring fork simply because few riders were capable of maintaining air pressure.

Unfortunately for Kawasaki, radiators might be a sales gimmick, but the fickle motocross market has shown an insatiable desire for anything the factory rider uses. Thanks to the endorsement of works riders, everything from T-shirts to shorty levers has sold in amazing quantities. Whether 125-class riders need or can properly use watercooling is a moot point if they demand it regardless of the consequences. An "affordable" 125 MX bike, therefore, might seem like a good idea, but unless riders can get the latest trick stuff, they might just drop out of racing anyway.

For all the disadvantages Kawasaki sees in watercooling, its benefits are indisputable in a theoretical way. Even the staunchest Kawasaki fan cannot deny that more controlled cooling of the cylinder permits closer tolerances because localized expansion problems due to heat can be avoided. And these closer tolerances can lead to a boost in power. The boost might not be large, but any power increase in the 125 class is significant in the end.

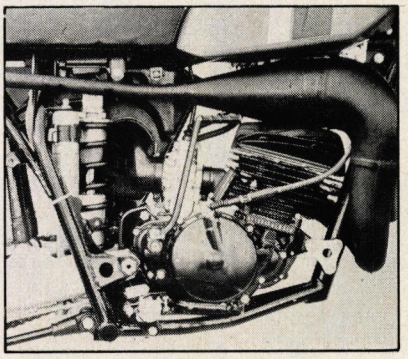
Furthermore, our test KX125 suggested that in attempting to keep its bikes performing on par with watercooled bikes, Kawasaki has encountered precisely the tolerance problems watercooling is designed for. More radical timing and bigger ports have improved the bike's horsepower, but without additional fin area, the engine runs hotter. And at times, this bike's engine ran hot enough to warp the exhaust port bridge and partially seize the piston. The situation improved with time, but the KX still ran too hot for comfort.

Kawasaki has a point about the rising ante of 125 motocross racing—but, unfortunately, racing is racing. And that means it's difficult to get to the checkered flag first when you're handicapped as soon as the starting gate slams down. Kawasaki has done the right thing for Monday through Saturday, but it might have built the wrong bike for Sunday. —*David Dewhurst*



New wide exhaust port with bridge

The scuff that seizures are made of.



Trying to look cool without radiators

Air in the fins is really deflating.

Ride Review

• Okay, what's all the fuss here? Personally, I think this new KX125 is a perfectly wonderful little motorcycle—if "little" is an appropriate word when describing a bike with a 58-inch wheelbase and a 37.7-inch-high seat.

No matter, though, for in my opinion, at least, the KX is a seriously fun motorcycle to ride. There's no question that the thing goes a hell of a lot faster than any eight-cubic-inch motorcycle has a right to go, especially once you figure out that the best recipe for speed is to stir the shift lever after adding equal portions of full throttle and maximum rpm. And thanks to the modern-day wonders of Uni-Trak rear suspension and Greyhound-class wheelbases, the KX will let you ride over things that most people wouldn't dare *hike* over.

The only problem with the KX125 is that all of the other bikes in its class do pretty much the same thing. Most of them, in fact, do it even better and, with the advent of watercooling, considerably longer, as well. So really, there's only one thing about the bike that turns me off: Unless I had no reason to be competitive, I simply wouldn't race one in the 125 class. In 1980 on this 1981 bike I'd have at least tried; but in 1981, I'd rather watch. Because there's a world of difference between fun and winning.

—*Paul Dean*

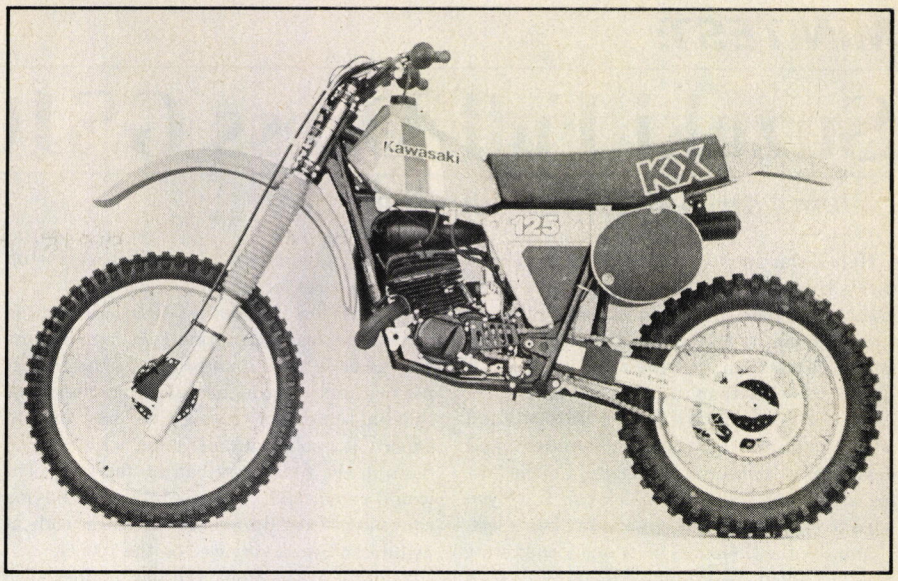
• I've been riding the same motorcycle from Kawasaki for the last three years. And frankly, I'm tired of it.

Sure, I know that the KX has changed its specifications in that time—more horsepower, more suspension travel and like that. Yet the way the package fits together and the way it works on the racetrack hasn't truly changed a bit in all that time. The powerband personified peakiness, so there's no such thing as throttle control. Unless you want to run into the wall of Jello lurking below the powerband, you control forward momentum with the shift lever, not the twist-grip. The suspension absorbs more punishment these days, but the KX still prefers to get flat-ass sideways whenever possible, slithering from berm to berm in perfect balance, the engine screaming at 12,000 rpm.

But my point is that Kawasaki is still building a motocross bike for Friday nights—smooth, hard-packed tracks and short motos where a high-revving slider is at its best. When it comes to rugged Sunday, the KX125 is just out of its element. Yes, I used to get along with the KX just fine. But after riding four years' worth of bikes that offer grown-up throttle-control and handling, I'm no longer satisfied with the KX's adolescent personality.

—*Michael Jordan*

Kawasaki KX125A7



SPECIFICATIONS:

IMPORTER: Kawasaki Motors Corp.
2009 East Edinger Avenue
Santa Ana, California 92711

CATEGORY: motocross

SUGGESTED RETAIL PRICE: $1399

ENGINE

Type ..... two-stroke vertical single
Port arrangement ... one reed-valve-controlled intake, four main transfers, one booster transfer, one exhaust
Bore and stroke ..... 56.0mm x 50.6mm
Displacement 124.6cc
Compression ratio (corrected) 7.7:1
Carburetion ..... one 34mm Mikuni slide/needle
Air filter ..... washable oiled foam element
Lubrication ..... pre-mixed fuel and oil
Starting system ..... primary kick
Ignition ..... internal-rotor magneto CDI

DRIVETRAIN

Primary drive ..... straight-cut gears; 3.55:1 ratio
Final drive ..... #520 chain (⅝-in. pitch, ¼-in. width) / 4.42:1

Gear	Internal gear ratio	Overall gear ratio	MPH per 1000 RPM
I	2.14	33.60	2.27
II	1.67	26.13	2.92
III	1.33	20.90	3.65
IV	1.15	18.03	4.23
V	1.00	15.68	4.86
VI	0.91	14.25	5.34

SUSPENSION/WHEEL TRAVEL

Front ..... air spring, 38mm stanchion tube diameter / 10.4 in. (264mm)
Rear ..... 15mm spring preload adj. 4-position adj. damping / 11.3 in. (286mm)

BRAKES

Front ..... drum, single-leading shoe
Rear ..... drum, single-leading shoe, rod-operated

TIRES

Front ..... 3.00 x 21 Bridgestone Motocross M27
Rear ..... 4.00 x 18 Bridgestone Motocross M22

DIMENSIONS AND CAPACITIES

Weight ..... 207 lbs. (94kg)
Weight distribution ..... 48% front, 52% rear
Wheelbase ..... 57.6 to 58.6 in. (1463 to 1488 mm)
Seat height ..... 37.7 in. (958mm)
Handlebar width ..... 33.0 in. (838mm)
Footpeg height ..... 16.6 in. (422mm)
Ground clearance ..... 13.3 in. (338mm), at engine cradle
Steering head angle ..... 28 degrees from vertical
Front wheel trail ..... 4.7 in. (120mm)
Frame ..... tubular chromoly steel, single downtube
Fuel tank ..... plastic, 2.2 gal. (8.2l)
Instrumentation ..... none

PERFORMANCE

Top speed (observed) ..... 60 mph (97 kph)

WARRANTY:
None

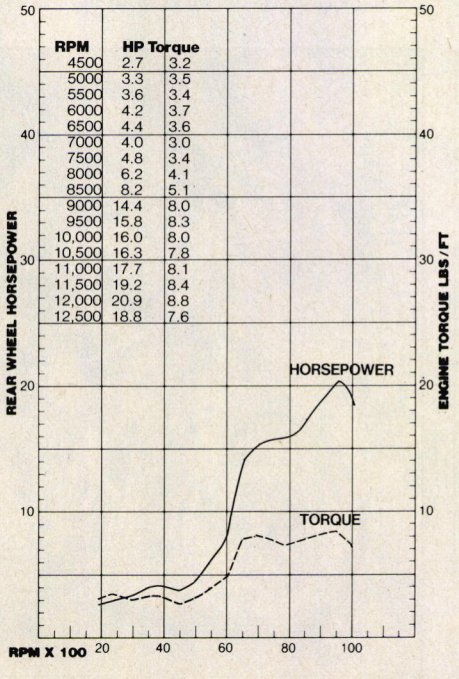
AVAILABLE COLORS:
Green

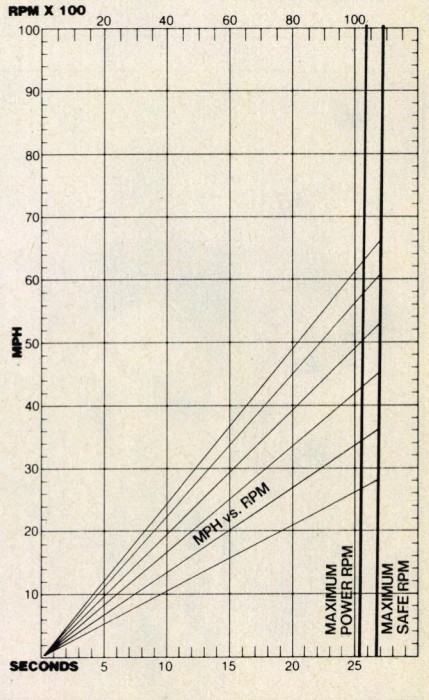
All weights and measurements are taken with machine unladen and fuel tank empty.

COMPARATIVE TEST DATA:

Make & Model	Horsepower	Wheel Travel Front/Rear, in.	Weight (fuel tank empty), lb.	Weight bias Front/Rear percent	Transmission, number of speeds
Kawasaki KX125 A7	20.9	10.4/11.3	207	48.0/52.0	6
Kawasaki KX125 A5	20.0	9.8/10.0	194	46.9/53.1	6
Honda CR125R-'80	20.8	11.5/10.8	202	45.8/54.2	6
Suzuki RM125T	19.8	11.2/11.7	200	47.0/53.0	6
Yamaha YZ125E	15.9	9.3/9.1	198	48.7/51.3	6
Husqvarna 125 CR-'80	18.8	11.8/11.8	214	43.9/56.1	6

PERFORMANCE:





MINITEST:

Suzuki Full-Dress GS1000G

Solving an unbalanced equation

• Here's this month's math problem. Begin with a known quantity, one that equals considerably more than the sum of its parts. Add to it another quantity that causes the resultant not only to be less than the new sum of its parts but significantly less than the original whole.

Puzzled? Start with a Suzuki GS1000G and add Suzuki's factory-recommended and dealer-installed touring package of Calafia fairing and saddlebags. One quick trip is all you need to explain the concept of more being less.

You see, the GS1000G in its unadorned state does just about everything extremely well, with no vices—sentiment you've read several times in these pages. However, most large-displacement, shaft-drive bikes also have strong appeal to the touring rider. Many will end up as full-dress touring rigs. And so, to keep its customers from going into the wilds of the aftermarket, Suzuki offers the Calafia touring gear through its dealers, providing the buyer with a one-stop shopping spree for long-haul goodies.

Which is fine if it works. Calafia is one of the recognized, leading touring gear manufacturers. And the fairing and bags on the Suzuki package reflect the high level of fiberglass work that the American touring rider has come to expect. It's solid, durable stuff; we found no flaws in the finish and had no fear any of it would come falling off the bike. But buying convenience and durable construction aside, it just doesn't work very well on the 1000G.

Starting at the front, the fairing does keep wind off your face and chest, but it also neatly ducts it around and over so it beats on your back and blows down your neck. As a result, on hot days you feel even hotter, on cold days even colder. To make things worse, there are no vents in the fairing, so if the weather is really hot, the rider is really, *really* hot. And any air coming over the fairing—the windshield's edge is cleverly positioned at eye level for most of us—buffets the rider's helmet excessively, giving him blurred vision for either watching the road or reaching for an aspirin bottle. Finally, the mounting system is another headache, as all the structure Calafia deems necessary to support the fairing sets up a metallic, rattling resonance with engine vibration that makes long trips—or short ones, for that matter—noisy, droning, tiresome experiences.

Out back are the not particularly capacious saddlebags, recessed on the bottom sides to clear upswept exhausts. The bags are wrapped in chrome bars to add protection and style but which also add width and weight.

All of this brings up a point that can stand more investigation. The GS1000G—a motorcycle of exceptional handling qualities—might be so well balanced as to be sensitive to additional weight hung on it in the form of touring gear. Our time with the Calafia Suzuki showed the tourer to be a ponderous wobbler, wiggling in rain grooves and slow to respond; generally, dubious weather protection aside, a much less pleasant motorcycle to go places on. Subjectively, it felt not really put together; like a quickly assembled kit, it was a collection of separate pieces rather than a unified whole. This doesn't temper our enthusiasm for the basic 1000G, and by itself the Calafia gear is just fine, but in this particular combination the 1000G deserves better. For now, the staff to a man would opt for the normal version for any trip of any length.

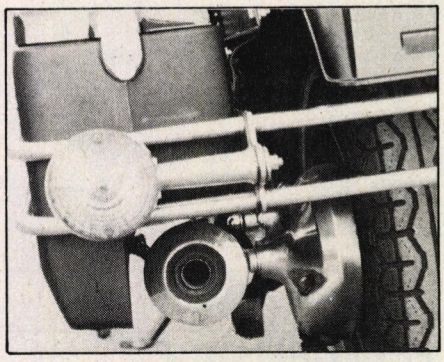
It's a simple case of less being more.

—Don Fuller

SUZUKI GS1000G

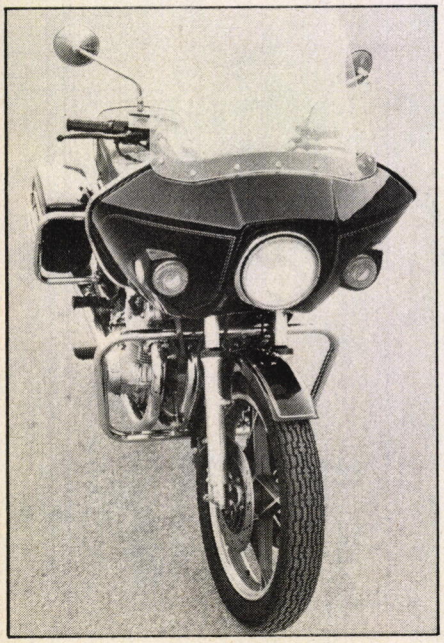
IMPORTER: Suzuki Motor Corp.
13767 Freeway Drive
Santa Fe Springs, California 90670

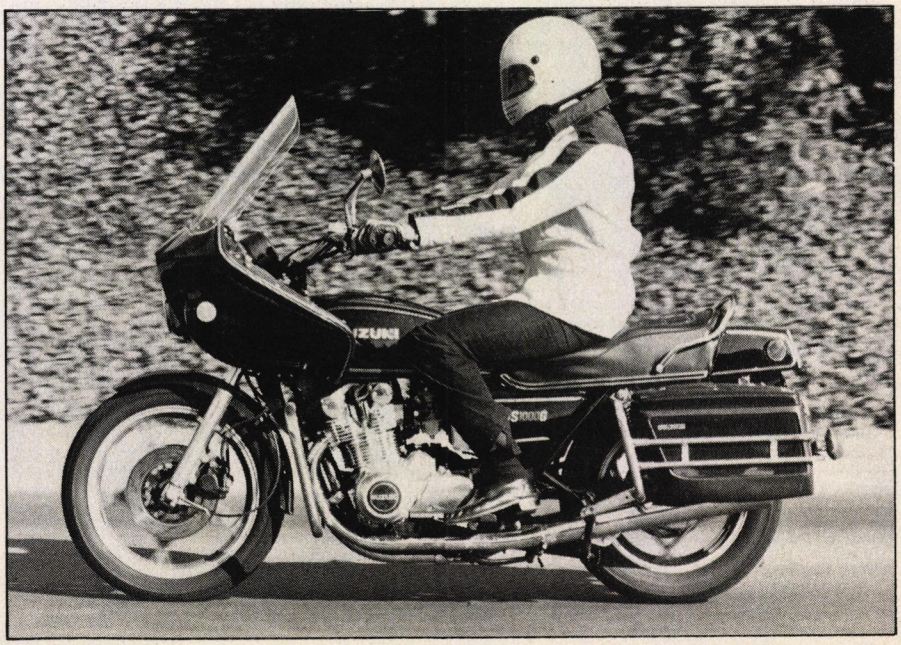
Suggested retail price	$4406.53 (as tested)
Engine type	four-stroke transverse vertical four
Valve arrangement	double overhead camshafts
Bore and stroke	70.0mm x 64.8mm
Displacement	997.4cc
Carburetion	four 34mm Mikuni constant velocity
Front fork / wheel travel	air-spring, 37mm stanchion tube diameter / 5.3 in. (135mm)
Rear shocks / wheel travel	5-way adj. spring preload, 4-way adj. rebound damping / 4.5 in. (114mm)
Wheelbase	59.8 (1518mm)
Seat height	32.3 in. (820mm)
Weight	610 lbs. (277kg)
Fuel consumption	39 to 45 mpg (16.6 to 19.1 km/l)



Notched saddlebags for upswept mufflers

Luggage space is only a pipe dream.





© 1981 PATRICK BEHAR

PRODUCT EVALUATION:

Countdown Combo Timekeeper

A timely way to make enduros run like clockwork.

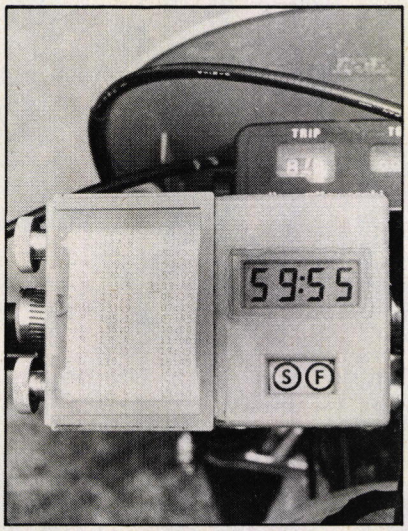
• To be competitive in an enduro, you have to do more than just make good time through the woods; you also have to *keep* good time. That's why no enduro bike is ever checkpoint-ready without an accurate odometer, an equally accurate clock and a holder for the route chart that tells you where you're supposed to be and *when*.

Performing the latter two of those three duties is the purpose of the Countdown Combo Timekeeper, a digital timer and route-chart holder combined into one unit. There's nothing revolutionary about either function, of course, since roll-type route-chart holders have been around for ages and digital clocks were first pressed into enduro service in the mid-Seventies. But in developing the Combo Timekeeper a few years ago, Jerry Counts of Countdown Engineering became the first to consolidate both operations into a single unit.

The right-hand half of the Combo's 3½-by-5-inch blue polystyrene case houses a liquid crystal display (LCD) whose half-inch-high numerals read out the minutes and seconds to 59:59 before returning to 00:00 and starting all over again. The clock is regulated by a quartz crystal and a standard watch-type microchip powered by two AAA batteries that nestle comfortably inside the roll-chart compartment. And since the microchip is an off-the-shelf item used in many other watch applications, the Combo has seven available display modes (AM/PM, date, etc.), although only two are germane to enduro riding—one for setting the timer and one for the actual timekeeping.

Selecting the various modes is simple. The continuous-running timer's display is changed or turned off/on by punching the "S" button on the control panel until the desired mode is reached. Once the clock is in minute-setting mode, the "F" button then resets the readout. And when the normal timekeeping mode is displayed, accidentally bumping either control button can't throw the clock out of time.

Just as thoughtful in execution is the route-chart holder, even if it's thoroughly conventional in concept. The clear plastic window is exceptionally large and easily removed by sliding it to the left. The knurled aluminum knobs on the chart rollers are large, and their shafts ride in replaceable rubber bushings that act as seals while also providing sufficient friction to keep vibration from moving the chart as you ride. There's enough room inside the compartment to accommodate the long route charts you get in lengthy enduros, and the holder even accepts standard 2¼-inch adding-machine paper should you choose to fabricate your own chart.



Combo unit tells all you need to know

Like that this rider's 15 minutes late.

Mounting the Combo offers no problems, either, for it simply attaches to the handlebar crossbar with a pair of small hose clamps, using short sections of rubber tubing as shock insulators. Once the unit has been loaded and set, Counts recommends sealing the control panel and all four sides of the chart window with duct tape. But other than that, the whole assembly is water-tight at every joint.

At $109.95, the Combo Timekeeper isn't what you would call cheap, but this price is right in line with that of any similar units on the market. And after several months of enduro experience with a Combo, we can't fault it in the least. It's highly accurate, easy to read, simple to use and thoroughly dependable. That's why you see them mounted on so many of the machines that high-point so many enduros—and there's no better endorsement than that.

The Countdown Combo Timekeeper is available only directly from Countdown Engineering, 22102 Covello, Canoga Park, California 91303. (213) 348-8381.

—Paul Dean

Total Prices! Free Shipping

Vetter

Windjammer IV complete (blk, wht, sil) **Lowers** — $339. / $74.95
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Windjammer V complete (blk, wht, sil) **Lowers** — $449. / $89.95
Saddlebags w/hardware — $289.95
Tail Trunk w/lights — $173.95
Vetter Sound 5" speakers — $73.95
WJ IV & V Options: Fiamm horns $21.95, Quartz light $21.95, Pop vents $9.95, Tall shield **add $5**
Quicksilver compl. blk, wht sil. — $189.
Options: +5cm or -10 cm shield **add $5**, Quartz light $34.95, Wing tips $19.95

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Star II full face, Snell75 — $79.95
TourStar flush mount shield — $61.95
Magnum II fiberglass, open — $61.95
Moto III MX favorite — $74.95
Magnum III light, off-road — $51.95
RT versatile, open face — $48.95

SHOEI

FM-2 Sport fairing for **Street** bars
FM-3 Sport fairing for **Cafe** bars
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Kelvar 49 vented helmets Model 30 (RXM-1) — $169.95
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It's part of an engineering philosophy that's built into every BMW regardless of its displacement category or road usage. The new BMW R65 and R100, shown here, are two recent examples.

Two R65 Extra Margins for 1981: More power, new front brakes. This year's BMW R65, above left, is actually ten percent more powerful than last year's. It has also added double front disc brakes for smoother stopping power.

Yet it retains its singular advantages of low weight, easy maneuverability. Plus a 6.2 gallon tank for the longest range in its category.

The newest big BMW and its virtues. The new BMW R100, above right, offers an almost limitless opportunity to customize to your own particular riding tastes with a whole range of factory-designed, and tested options. Options that are also factory-warrantied—unlike those of the usual mass-produced bikes.

Yamaha XS1100LH

SPECIFICATIONS:

IMPORTER: Yamaha Motor Corporation, U.S.
6555 Katella Avenue
Cypress, California 90630

CATEGORY: street

SUGGESTED RETAIL PRICE: $4599

ENGINE

Type ..... four-stroke transverse vertical four
Valve arrangement ..... double overhead camshafts
Bore and stroke ..... 71.5mm x 68.6mm
Displacement 1101.8cc
Compression ratio 9.0:1
Carburetion ..... four 35mm Mikuni constant-velocity
Air filter ..... disposable paper element
Lubrication ..... wet sump
Starting system ..... electric only
Ignition ..... battery / dual electronic pick-ups / dual coils
Charging system .. 12-volt; alternator, voltage regulator, rectifier

DRIVETRAIN

Crankshaft-to-jackshaft ..... Hy-Vo chain; 1.657:1 ratio
Jackshaft-to-clutch ..... straight-cut gears; 1.000:1 ratio
Clutch ..... wet, multi-plate
Transmission-to-jackshaft ..... straight-cut gears; 0.936:1 ratio
Jackshaft-to-driveshaft ..... spiral-bevel gears; 1.056:1 ratio
Driveshaft-to-rear-wheel ..... spiral-bevel gears; 3.300:1 ratio

Gear	Internal gear ratio	Overall gear ratio	MPH per 1000 RPM
I	2.24	12.08	6.0
II	1.63	8.78	8.3
III	1.29	6.94	10.4
IV	1.03	5.58	13.0
V	0.88	4.77	15.3

SUSPENSION/WHEEL TRAVEL, IN.

Front ..... air / spring, 37mm stanchion tube diameter / 6.5 in. (165mm)
Rear ..... 5-way adjustable preload, 4-way adjustable rebound damping / 4.5 in. (114mm)

BRAKES

Front-only brake ..... single-action hydraulic caliper, 11.7 in. (298mm) disc
Unified front / rear brake system ..... rear single-action hydraulic caliper, 11.7-in. (298mm) disc interconnected to front single-action hydraulic caliper, 11.7-in. (298mm) disc

TIRES

Front ..... 3.50H19 Bridgestone Mag Mopus L303
Rear ..... 130/90-16 67H Bridgestone Mag Mopus S714

DIMENSIONS AND CAPACITIES

Weight ..... 562 lbs. (255kg)
Weight distribution ..... 45.6% front, 54.4% rear
Gross vehicle weight rating (GVWR) ..... 1090 lbs. (494kg)
Wheelbase ..... 61.3 in. (1556 mm)
Seat height ..... 31.5 in. (800mm)
Handlebar width ..... 29.0 in. (737mm)
Footpeg height ..... 12.5 in. (318mm)
Ground clearance ..... 6.3 in. (159mm), at center stand
Steering head angle ..... 29.3 degrees from vertical
Front wheel trail ..... 5.12 in. (130mm)
Frame ..... tubular mild steel, double front downtubes
Oil capacity ..... 4.3 qt. (4.0/)
Fuel tank ..... steel, 4.1 gal. (15.5/) including 0.5 gal (2.0/) reserve
Instrumentation .... speedometer, odometer, tripmeter resettable to zero, tachometer

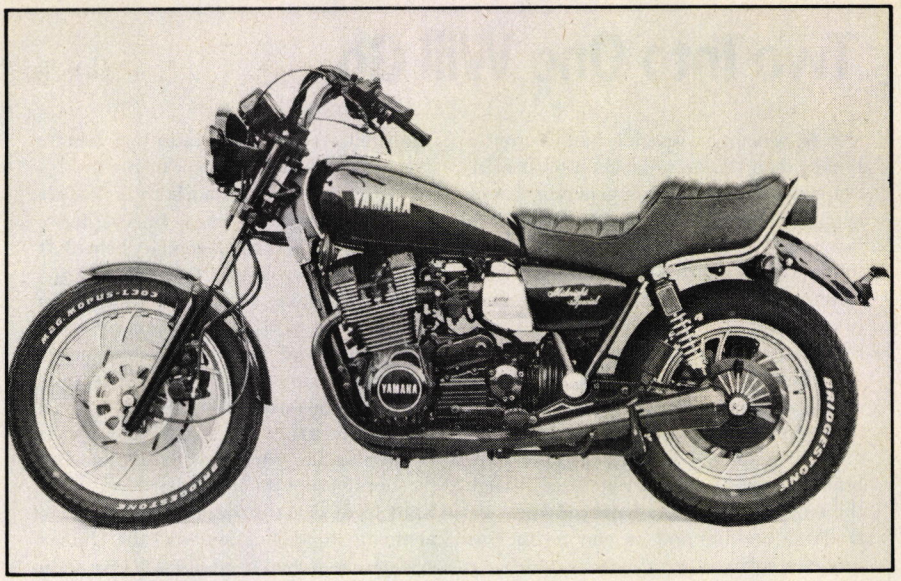
PERFORMANCE

Fuel consumption ..... 41 to 46 mpg. (17.9 to 19.6 km/l)
Range, maximum ..... 168 to 189 miles (270 to 304 km)
Range, reserve only ..... 21 to 23 miles (34 to 37 km)
Speedometer error, 30 mph indicated ..... 29 mph actual
Spedometer error, 60 mph indicated ..... 60 mph actual
Best ¼-mile acceleration . 11.993 sec., 113.49 mph (183 kph)
Top speed (calculated) ..... 130 mph (209 kph)
Stopping distance from 30 mph ..... 29 ft. (8.8m)
Stopping distance from 60 mph ..... 133 ft. (40.5m)

WARRANTY: 6 months

AVAILABLE COLORS: black / gold

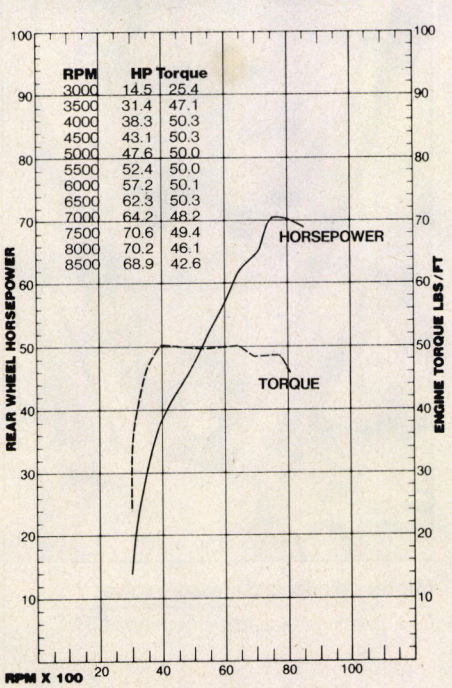
All weights and measurements are taken with machine unladen and fuel tank empty.

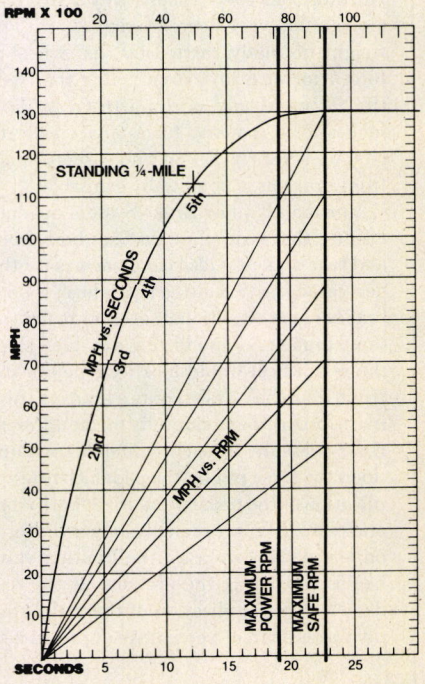


COMPARATIVE TEST DATA:

Make	Quarter-Mile, sec / mph	Top Speed, mph	Weight, lbs	Stopping Distance From 60mph, ft.
Yamaha XS1100LH	11.99/113.5	137	562	133
Yamaha XS1100SG	11.94/112.6	135	572	129
Yamaha XS1100SF	12.12/111.9	134	573	136
Honda CB900C	12.44/107.9	132	588	155
Kawasaki KZ1000 Shaft	12.19/112.2	132	582	129
Suzuki GS1000G	12.34/110.8	139	564	141

PERFORMANCE:





Continued

Two Into One Will Go

• It is difficult to imagine more powerful brakes than those available on most modern superbikes. They are generally strong enough to lock the wheels of the fastest or heaviest bikes, making the most stable of motorcycles a bucking rodeo mount.

You might think that Yamaha's new improvement in brakes, the Unified Brake System, to be fairly redundant as a result. But the UBS brake does not offer more sheer stopping power than regular brakes; it *does* allow far more effective use of what is already available. Specifically, the UBS brake connects front and rear discs through the foot lever for more balanced and controllable braking and an end to bucking bronco stops.

Much like the designs used by Moto Guzzi and Bimota, Yamaha's UBS operates one of its twin front discs and the rear disc by a conventional rear brake pedal. So any attempt to use the rear brake will automatically operate the front brake as well. The right front disc, meanwhile, is controlled by the normal handlebar lever.

The UBS is particularly important for less experienced riders who either lack the coordination to use both brakes to the maximum, or simply do not use the front brake at all. Difficult as it may be to imagine, many riders use little or no front brake for fear of locking the wheel and falling. It's much safer, they feel, to rely only on the rear brake, even if it does give considerably less braking effect.

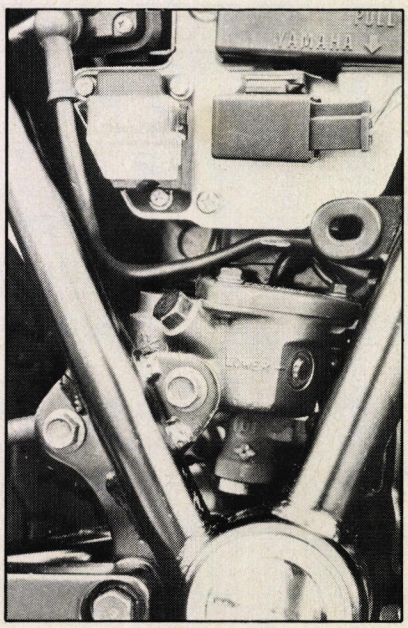
As any experienced rider knows, though, whenever you apply the brakes, weight is transferred forward. That accounts for your passenger hitting you in the back whenever you stop and also explains why a rear tire alone offers very little braking effect. The weight normally carried by that wheel is forced forward in a stop, giving the front tire far more traction than the rear. This makes it all too easy for a novice rider to lock up a rear wheel and not use as much front brake as is potentially available.

Yamaha's Unified Brake System not only ensures that a rider always uses both front and rear brakes, it also compensates for the decreased traction at the rear wheel. If both brakes of a conventional setup were fed the same brake pressure during a sudden stop, the rear wheel would lock long before the front. Yamaha's design puts a limiting valve in the brake line to carefully meter different fluid pressure to each caliper depending upon the force put on the pedal. Gentle application of the pedal pressurizes both front and rear brake lines equally; but as the force on the pedal increases, the limiting valve begins restricting the pressure at the rear disc. Further application of the pedal simply forces a larger percentage of pressure to the front wheel, so the ratio between the two brakes varies in a linear manner.

As well as ensuring that both brakes are always applied to maximize braking force, the Yamaha UBS has a secondary benefit: It acts as a self-leveling system. Because you apply both brakes at the same time and in the correct proportion, the bike compresses both front and rear suspensions more evenly. The motorcycle simply settles onto its suspension rather than crashing down on its front end as in a front-wheel-only stop. It is still possible to make the motorcycle dive by simply using the handlebar lever to the right front disc, of course. Whether used alone, or in conjunction with the Unified system, the second front disc will give additional stopping power and affords an option on just how quickly you want to stop.

The reduction in front-end dive produced by the UBS actually is just as important as the correct proportioning of front and rear braking. By minimizing the reduction of rake and trail that normally occurs under braking, Yamaha's system effectively stabilizes the front wheel, making panic stops even more controllable. That's why the XS Eleven Midnight Special is so pleasant to ride in everyday situations as well as during emergency maneuvers.

And that is just what Yamaha intends with its Unified Braking System. Powerful braking still relies largely on rider skill, but the UBS makes the very difficult job of motorcycle control much easier for novice or expert. —*David Dewhurst*



Master cylinder and pressure valve

The pressure-sensitive heart of UBS.

Ride Review

• Hot rods aren't supposed to wear gold jewelry. They need flashy red flames on the gas tanks; after all, they are *hot* rods. That's the way I feel about the Eleven Special. It's a hot rod. The moment you twist the grip, pyropower burns the rear tire's rubber, and you're blazing in glory that only hot rodders understand. XS Eleven-hot rodders treat that horsepower as a toy—when you're tired of the scenery, just add coal to the boilers to launch you into the horizon as though ejected from the north slope of Mount St. Helens.

There's another toy you'll like about this Eleven—the integral braking system. When you want to flame-out, just tap the foot pedal, and it stops as though there are suction cups attached to the tires. Stopping as well as frying asphalt is fun with the Eleven Special. It's my favorite hot rod and stop rod. —*Dain Gingerelli*

• The UBS brake is the most important change to the Eleven Special this year because it makes the bike far more manageable in civilian circumstances. Braking in stop-and-go traffic is simplified, and the reduction in weight transfer, front-end dive and changes in steering-geometry encourages aggressive behavior with the front brake. So the Eleven now has a more soothing in-town personality.

In emergency situations, though, I reserve judgment on the UBS. I can't get used to modulating foot brake and hand brake simultaneously. Deciding which input is causing imminent front-tire lock-up is easy to understand intellectually, but not so easy to sort out at 60 mph. So while I admit the UBS makes the Eleven better for boulevard use, I'm not convinced it fits in with the bike's taste for speed. —*Michael Jordan*

• If I had to own a custom motorcycle it would be a Yamaha Midnight Special. While I prefer a more straight-barred approach to motorcycling, the XS1100LH really is striking. It is special even among Specials. America is overflowing with all too many custom motorcycles which somehow don't deserve the title when stacked against this bike.

Cosmetically it draws attention on every street corner, which, in my view, is what custom motorcycles are all about. And yet the 1100cc motor makes the Yamaha much more than a cosmetic gimmick. This black and gold beauty is as quick as silver. My only reservation is for the Unified Brake System which may help the neophyte, but hinders me. Just give me a Midnight Special with a triple order of discs to go.

—*David Dewhurst*

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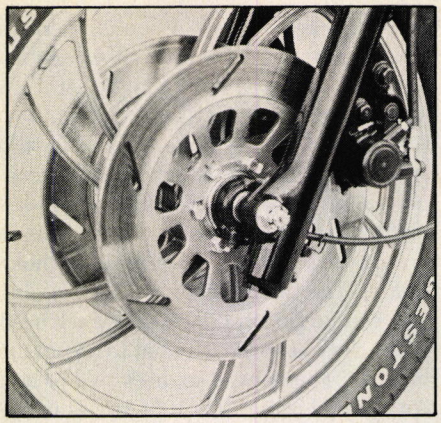
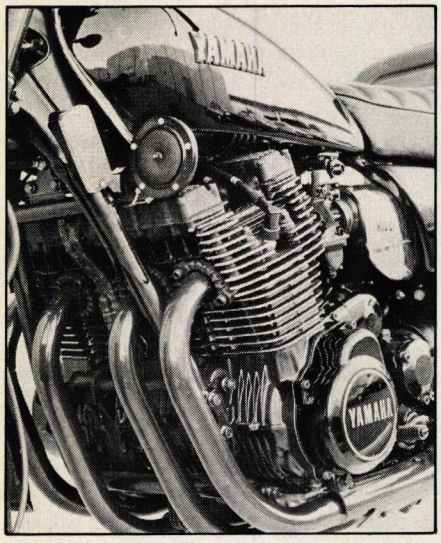


Twin perforated discs on spun-gold mag

But only one works at a time.



Hot-rod engine is part of the style

Punctuated by 50 lbs/ft of raw torque.

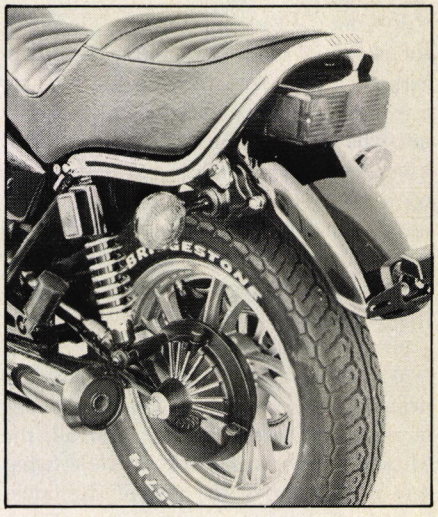
Charting The Changes

Engine: Change to electronic ignition advance. **Brakes**: Switch to Unified Brake System (UBS). System links left front disc to rear disc. When brake pedal is depressed, both left front and rear brakes are applied. Front brake lever operates right front disc. (See related story page 61).

Wheels: Same sizes as last year, but in spun design first seen on RD350 L/C.

Tires: Same dimensions as in 1980; tubeless as before. New raised white letters.

Details: New seat shape and foam. Redesigned mirrors with ball joints. Rubber ignition keyhole cover.



Strong, flowing lines tell the story

Twin taillight is the anticlimax.

Although Yamaha seems to think that UBS will be more of a benefit to novices than to experienced riders, all of the testers who rode the Midnight Special favored its brakes—up to a point. In most stopping situations UBS responded to firm pedal pressure by settling the bike on its suspension and bringing it to a straight stop—no sudden, unmanageable weight transfer, no rear-end lift, nothing other than scrubbed-off speed. It's worth noting that stops using only the rear brake pedal increased the braking distance by about 30 percent, and that braking with only the lever-controlled single disc produced noticeable fork flex that probably would have gone undetected if both front discs had been applied evenly. Unfamiliarity with the UBS and perhaps different braking force applied to the two front disc rotors made panic stops using both pedal and lever a little unnerving, though braking distances from both 60 mph and 30 mph are roughly the same as a non-UBS XS Eleven Special that we tested one year ago.

Suspension components are the same as on the year-old Eleven, too: Showa air-spring fork with 37mm stanchion tubes and Kayaba shocks with four adjustments for rebound damping and five preload settings. Putting the shocks on the first preload notch and the second or third damping setting seems to be the best all-around combination, but regardless of the setting, the Midnight Eleven rides rough-shod over freeway expansion joints. The fork, pumped up to about 10 psi, works smoothly to lessen the severity of the jolts, but the oversprung rear passes them straight up to the rider, with little comfort-buffering from the restuffed but on the whole unresilient saddle.

The firm suspension works better in the twisties, where the big, black Special eats up corners willingly at about 8/10 speed. Below full-out running the Midnight Special will track a precise line through any corner you can find, the rear end wiggling only when you chop the throttle in mid-turn and the suspension sags. It's a mistake to confine a bike as good as the Midnight Special only to boulevards and profiling. Despite the upright seating position, the bad, bad, scooter is really a pretty nice ride. The seat/pegs relationship is just about right and even the buckhorn bar doesn't cut into your pleasure.

In the end, though, it's not the mechanics of the Midnight Special that define it, it's the gut-punch graphics. They reach out and draw crowds. Harley guys fold their arms and rock back on their heels while they tell you about rides they used to take. Ducati owners pull up to get a closer look and just to talk shop. LTD riders walk over to brag about their bikes—and the bikes they're looking at for next year. Guys who always meant to get a bike but never had the time. Anyone. The Midnight Special is a rolling invitation to a motorcycle event, wherever you park it. In the evolution of the factory custom it's the very special-Special, reminding us of what these bikes are all about better than any other custom-style motorcycle, bar none. •

• Motorcycle vogue changes every year. More cylinders, fewer cylinders. Round headlights, rectangular headlights. New models come and go, each one seeking to be in some way unique, memorable. But of all the new motorcycles around this year not one will leave its mark like the XS Eleven Midnight Special, a bike about as subtle as a grinning rowdy slapping a lead pipe into an open palm.

The plain truth is that most Specials aren't so special anymore. Factory customs from every major manufacturer are cruising downtown America in such vast quantities that the boulevard style that was once a major statement in bike preference has turned into nothing more than a quick dip in the mainstream.

But not the Eleven Midnight Special. In some way its black-and-gold surface triggers a common nerve in most riders, transforming the aging musclebike underneath into what custom motorcycling is all about. Forget that it's not handbuilt over the course of months. Ignore the fact that it's not one of a kind, assembled from pieces with a dozen different labels. It doesn't matter; the Midnight machine snarls its hot-rod message more clearly than any other motorcycle you can buy.

Which is exactly what the product planners at Yamaha intended. That slight edge of recognizable menace is, after all, the Midnight Special's stock in trade, what sets it apart from the rest of the buckhorn-barred population. And then there's exclusivity. The limited-edition status of all three Midnight Specials—a Midnight Maxim has been added to last year's small complement of black-and-gold 850s and 1100s—insures that you won't be seeing them with the same frequency as Yamaha's ubiquitous everyday Specials. But with one or two of the Midnight bikes of each displacement in almost every Yamaha dealership, when you do focus on black and gold you *are* expected to stand around and gawk long enough for the salesman to show you what you really wanted in the first place—that is, if you still remember what you came in for.

What you'll be ogling is more than just some black chrome and a dash of gold paint here and there. The Midnight Specials are flashed-up versions of the regular Specials, true, but the detailed execution of the concept lends an aura of custom handicraft. What you see is what you pay for, though. The Eleven Midnight Special carries a pricetag $400 heavier than it's before-Midnight counterpart.

It might look like you get nothing more than a zoot paint job for that steeper tariff, but the difference goes deeper. Problems in color-matching the gold on various surfaces led Yamaha engineers to develop new technology to get the finishes on—and keep them on. The goal was gold, or at least the look of it. To find that look, a new painting technique called Nebula was created. It shows up on the Eleven's disc carriers and the new 1981 spun mag wheels. The second Midas touch was SY, a plating process that's used on the headlight rim, handrail, carb tops and gas cap.

ROAD TEST:

Yamaha XS1100LH Midnight Special

Grab onto the All-American musclebike. Then hang tough.

BY LARRY WORKS

For the black that dominates the Midnight idiom some new solutions arose. The tank received coats of pure black, no-sparkle paint topped with several coats of individually baked clear lacquer. Black chrome plates the handlebar, headlight shell, instrument bodies, shock spring covers, petcocks and mirror frames. A black wrinkle-finish marks the triple clamp. Pretty straightforward styling licks, all things considered, until it came to the exhaust pipes. They couldn't hold their black finish with any conventional plating techniques. By itself, black chrome will turn ash gray under the 400-plus degrees that a modern lean-jetted four can produce. So to keep these pipes from graying, they are first polished, then triple-plated in nickel, black-chromed and finally oil-polished. The deep shine on the shorty pipes is as much function as flash, according to Yamaha, since the involved plating process leaves a highly rust-resistant finish.

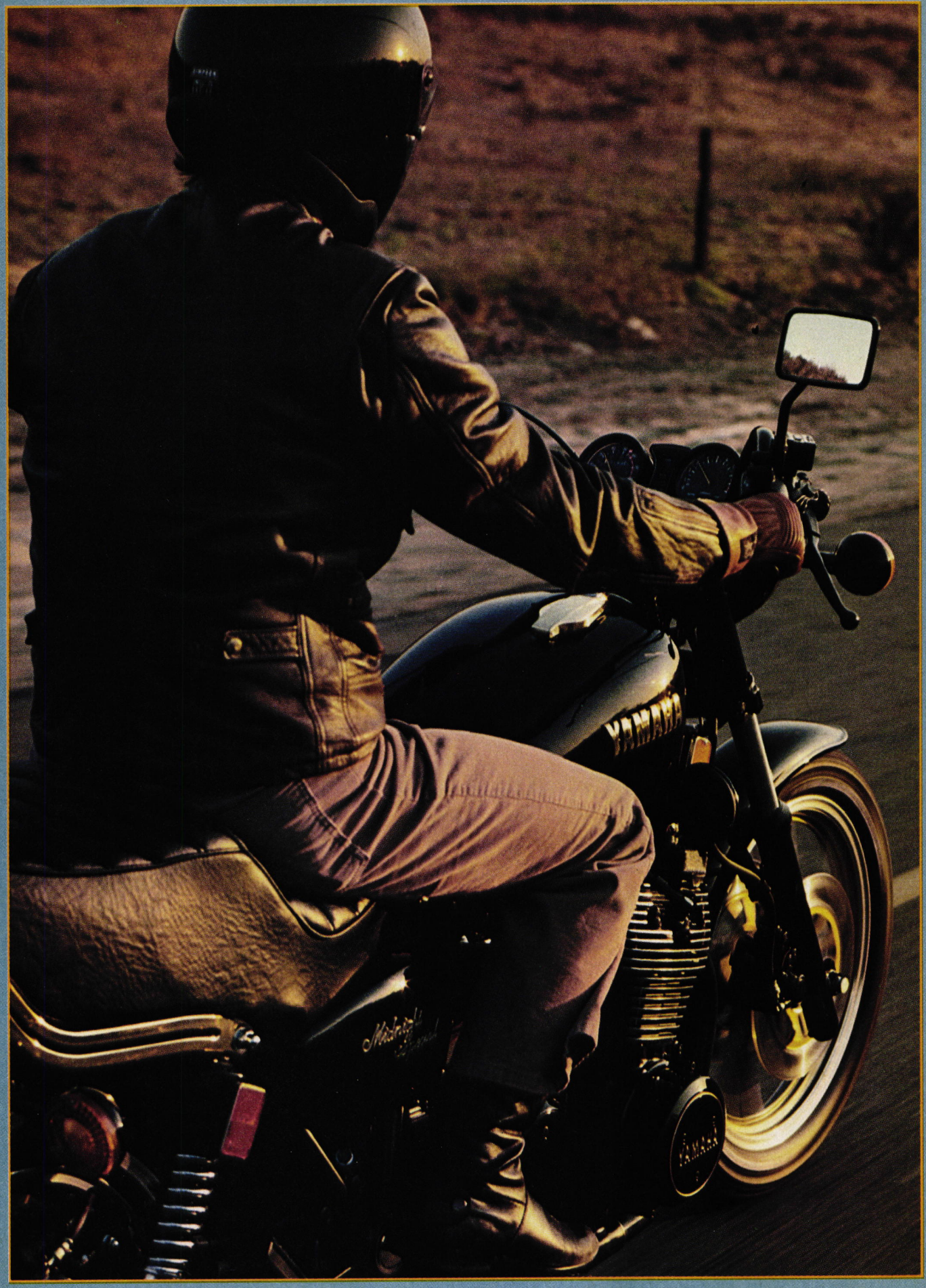
If there's any doubt in you that the Midnight Eleven's cut-the-crap-and-ride looks aren't backed up by an equally serious powerplant, you haven't been paying attention for the past few years. Underneath all the finery is an XS Eleven, the quintessential musclebike. A quick stab on the starter button puts 70 rear-wheel horsepower and—even more convincing—50 lbs/ft of torque at the ready. At least it does if you've got the three-position choke full-on. The change made to EPA-pleasing lean carburetion in 1980 means you'll need the choke whenever you want to fire up the big four, whether the engine's cold or not. An internal change for 1981 trades in the vacuum advance that marked earlier Elevens for an all-electronic timing advance that's a common part with other Yamahas.

One of the big advantages of all that torquey, wide-spread grunt is that fifth gear is just about as effective as third for around-town riding. Maybe even better, since staying in fifth for any speed above 30 mph doesn't make you work the Eleven's cranky gearbox to keep moving. The Eleven demands to be shifted on its own terms, with a firm boot and the gearbox shaft speeds evenly matched. Any other technique will be met with thunks, clunks and an occasional missed shift.

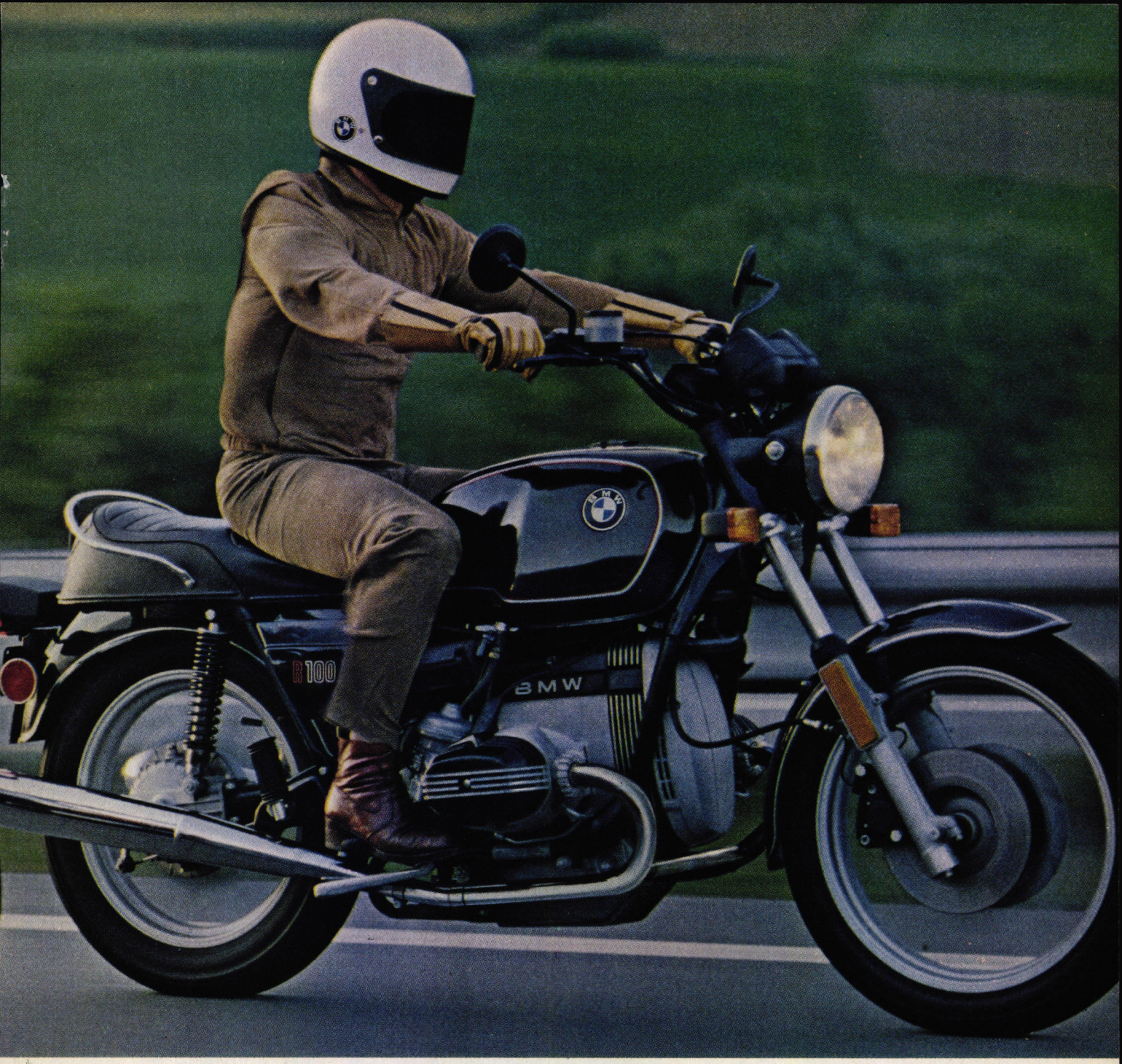
Once you've come to terms with the transmission, working the Midnight Special through traffic is a breeze. When you're pointed in the right direction a flick of the wrist cracks open the bank of 34mm constant-velocity Mikunis, and 1101 rubber-mounted cc make the images in the new ball-joint mirrors get small very fast. The same thing seems to happen almost anytime you roll on the throttle, regardless of engine speed. When you really thwack open the CV butterflies, though, expect the mirrors to clear themselves completely. A WFO grab is rewarded with a staggering lunge of acceleration that threatens to detach your retinas and pump all of the blood in your head to a lower level—like your socks. Shaft-drive torque reaction forces the rear end to jack up, the speedometer needle swings hard right to the stop and the next county looms into view.

Bringing all that rolling fury to an upright stop requires substantial whoapower, which the Midnight Special has. Yamaha is using its 1981 Midnight Eleven as a weather vane for its new Unified Braking System (see UBS story page 61), which links one of the front discs with the rear disc brake so that a push on the brake pedal stops both ends of the motorcycle. What's interesting about UBS isn't that it stops you quicker than a conventional braking system but how quickly you get used to the idea of relying on your foot in almost every stopping situation.

Continued



PHOTOGRAPHY © 1981 DAVID DEVYHURST



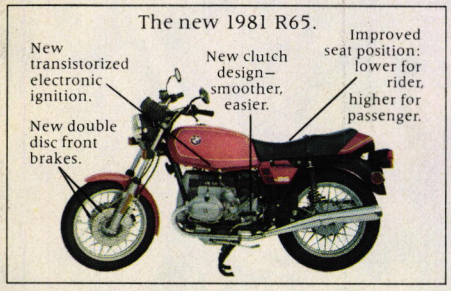
The Alps first. Then the drawing board. These are not theoretical bikes.

Unlike the multitude of well-made but mass-produced bikes that swarm America's shores, BMWs very deliberate limited production concept starts with a rigorous 1000 kilometer-per-day testing schedule on some of the most demanding roads on earth.

Out of this road experience, BMW builds an extra margin of response and dependability into each of its bikes that is far beyond the usual.

But, as our Alpine Team—as well as numerous BMW owners across America will readily agree—reading about a BMW and riding one are two totally different experiences.

We heartily recommend the latter course to you.


The new 1981 R65.
New transistorized electronic ignition.
New clutch design—smoother, easier.
Improved seat position: lower for rider, higher for passenger.
New double disc front brakes.

BMW.

FOR ONE LONG SHINING MOMENT, STOP COMPROMISING.

For a list of authorized BMW Dealers where you can see the 1981 BMWs and for a complete, illustrated guide to them, write Dept. I-1, BMW of North America Inc., Motorcycle Group, Norwood, NJ 07648.

MOTORCYCLE SAFETY FOUNDATION
EXPOSURE QUESTIONNAIRE 1981

• This publication is making this space available as part of an exposure data collection study being conducted by the Motorcycle Safety Foundation. Several publications are cooperating with the MSF by featuring this questionnaire in their January, 1981 issue. If you read several magazines in which it appears, please fill out only one. Return the completed form to: Motorcycle Safety Foundation Exposure Study, 780 Elkridge Landing Road, Lithicum, Maryland 21090 before January 31, 1981.

1. How many miles did you operate (drive) a motorcycle last month? 150
2. How many miles did you operate (drive) a motorcycle during the last 12 months? 7000
3. How many months did you operate (drive) a motorcycle during the last 12 months? 8
4. What percentage of your riding occurred during daylight hours? 70 %

The next three questions deal with what types of streets you rode on during the past 12 months. Your answers should total 100%.

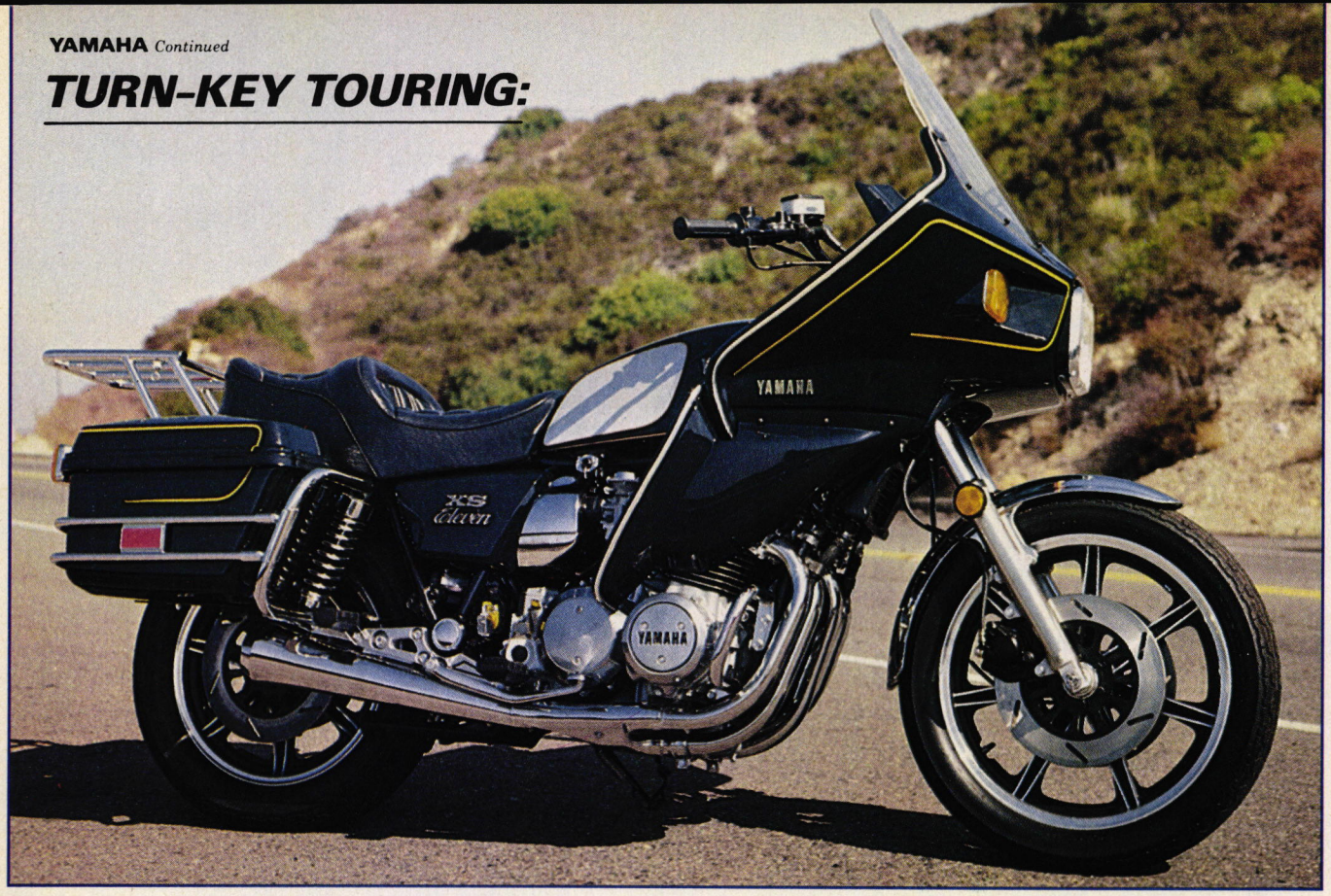
5. What percentage of your riding is on city/urban streets? 40 %
6. On county/suburban streets? 40 %
7. On expressways? 20 %
8. During the average week, how many round trips do you make on a motorcycle? 80 %
9. What is the primary purpose of these trips?
   - ___ Commuting to/from work (school)
   - ___ Recreation
   - ___ Shopping
   - ___ Visiting friends/relatives
   - V Other (All mentioned)
10. What is the average number of miles of your round trip? 25
11. Do you own a motorcycle helmet? V Yes ___ No
12. What is the dominant color of the motorcycle helmet you use most often?
    - V Black
    - ___ Blue
    - ___ Gold
    - ___ Other
    - ___ Green
    - ___ Orange
    - ___ Red
    - ___ Purple
    - ___ Silver
    - ___ White
    - ___ Yellow
    - ___ Do Not Use
13. On the helmet you wear most often, where is the reflectorized material located?
    - V No reflectorized material
    - ___ Only on back
    - ___ Only on sides
    - ___ On both sides and back
    - ___ Do not use

The next five questions will use the following scale: Never, seldom or 25% of the time, about 50% of the time, most of the time or 75% of of the time, and always. Please respond using this scale.

14. How often do you wear a motorcycle helmet while riding? 99%
15. How often do you wear gloves while riding? 10%
16. How often do you wear boots or over the ankle shoes while riding? 100%
17. How often do you wear bright colored clothing while riding? 90%
18. How often do you ride with your headlight on during daylight hours? 100%
19. Have you taken a motorcycle rider course? ___ Yes
    V No (go to question 24)
20. A. How many hours of training in the course? ___
21. B. Did the course have a classroom portion? ___ Y ___ N
22. Off-street on cycle portion? ___ Y ___ N
23. On-street portion? ___ Y ___ N
24. Do you own a motorcycle? ___ No (go to 30) V Yes
25. If yes, how many motorcycles do you own? 2
26. For the motorcycle ridden most often, who is the manufacturer?
    - ___ Honda
    - V Suzuki
    - ___ Other
    - ___ Yamaha
    - ___ Harley-Davidson
    - ___ Kawasaki
    - ___ BMW
27. For the motorcycle ridden most often, what size engine does it have? 750 cc
28. What is the dominant color for this motorcycle?
    - ___ Black
    - V Blue
    - ___ Gold
    - ___ Purple
    - ___ Green
    - ___ Orange
    - ___ Red
    - ___ Other
    - ___ Silver
    - ___ White
    - ___ Yellow
29. What year was the motorcycle made? 78
30. What is your zip code? 4 6 2 2 4
31. Sex: V M ___ F ___ No Response
32. Age: 20 years ___ No Response
33. What is the highest level of formal education you have completed?
    - ___ Graduate/Professional degree
    - ___ College graduate
    - ___ 2+ years of college
    - ___ Less than 2 years of college
    - ___ Trade or technical school
    - V High School graduate
    - ___ Other
    - ___ No Response
34. Do you have a license to operate a motorcycle on a public highway?
    V Yes ___ No
35. If yes, what state? Indiana

Please mail the completed form to:
Motorcycle Safety Foundation Exposure Study
780 Elkridge Landing Road
Linthicum, Maryland 21090

TURN-KEY TOURING:



Yamaha XS Eleven Venturer

Designed to handle the Interstates.

• Yamaha has finally ventured into the brave new world of turn-key touring. And the tongue-twisting name chosen for these ready-to-travel long-distance bikes is, appropriately enough, Venturer. There are even two of them for potential gypsies to choose from—an XS850 Triple and an XS1100 Four.

Both Venturers are based on the civilian line of XS-series street bikes (read: non-Specials); what's more, you can't even get one of those plain-Jane XS850s or XS1100s *without* the Venturer touring equipment already attached. The reason, according to Yamaha, is that the number of optionally tour-dressed 850s and Elevens that have rolled off showroom floors in the past couple of years has increased dramatically. So to meet that demand, and to simplify things for the dealers, Yamaha has decided that every non-Special 850 and 1100 will now come with a fairing and its attendant touring hardware. Period.

One highly influential factor affecting Yamaha's decision to enter the turn-key game was touring equipment—or, more specifically, the lack of its availability from YPDI (Yamaha Parts Distributors, Inc.), the parts and accessories arm of Yamaha in the U.S. The shortage was brought about partly by strong growth in the touring segment of the marketplace, and partly by a sales-incentive program initiated by Yamaha prior to the 1980 model year. That program encouraged dealers to buy lots and lots of touring equipment—and it worked. Too well. Yamaha didn't expect the overwhelming number of orders it received for touring bolt-ons. So instead of enjoying a smooth outflow of parts, Yamaha found itself with empty warehouses, a logjam of backorders and a multitude of unhappy owners.

Yamaha's game plan for 1981, however, guarantees that for every new standard-issue 850 and 1100—that company's two most-popular recipients of touring gear—there *will be* a fairing, saddlebags and all the usual chromeware included. In effect, then, the Venturer is similar to Honda's GL1100 Interstate in that it can roll off of the dealer's sales floor ready to ramble down the vehicular arteries of America.

In other ways, though, Yamaha's turn-key program differs slightly from Honda's. Where Honda makes all of its Interstate wrappings in Japan and then ships a single package across the Pacific, the Yamahas rendezvous with their touring hardware Over Here, simply because this is where those pieces are made.

Manufacturing differences aside, though, Yamaha's marketing people make no bones about the fact that the XS1100-based Venturer is aimed dead-center at the Interstate. They fully expect that even the most weathered of horizon-chasers will shop at Honda *and* Yamaha dealerships before deciding which 1100cc motorhome they want to own. So by having a complete touring package for sale, and at a competitive price as well, Yamaha dealers now have a better shot at keeping some potential Interstate owners riding behind the sign of the crossed tuning forks.

Yamaha dealers shouldn't have much trouble keeping their newly acquired turn-key touring clientele in replacement parts, since all of the

YAMAHA XS1100 VENTURER

IMPORTER: Yamaha Motor Corporation, U.S.
6555 Katella Avenue
Cypress, California 90630

Category	touring
Suggested retail price:	$4699
Engine type	four-stroke transverse vertical four
Valve arrangement	double overhead camshafts
Bore and stroke	71.5mm x 68.6mm
Displacement	1101.8cc
Carburetion	four 34mm Mikuni constant velocity
Gearbox	5-speed
Front fork / wheel travel	air-spring / 6.6 in. (168mm)
Rear shocks / wheel travel	5-way adjustable preload / 4.0 in. (102mm)
Wheelbase	61.9 in. (1572mm)
Seat height	31.5 in. (800mm)
Weight	633 lbs. (287kg)
Warranty	six months
Available colors	Indigo Blue

Venturer's over-the-road wares can be found in the YPDI catalog. The fairing is much the same as the one listed in the 1980 wishbook, and it's designed specifically for the standard XS Eleven. So the stock halogen headlight, for instance, fits—well, like the fairing was made for it. The package also includes ABS plastic lowers for the fairing that knife through the cold with great efficiency, but the problem is that they don't have any sort of tunnel vents to direct fresh air into the cockpit. Meaning that when the weather gets uncomfortably hot, so do you—unless you detach them.

Yamaha did find a cure for one problem that bothered previous fairing-equipped XS Elevens: nighttime windshield glare. It was caused by reflections from the illuminated instruments, but that fugitive light is intercepted on the Venturer by a matte-black sheetmetal shroud mounted atop the dash panel. The shroud looks kind of silly, sticking way up about six inches, but it works. You won't see the reflected faces of the speedometer and tachometer on *this* windshield at night.

You also won't see a travel trunk on the Venturer, night or day. Yamaha intended to equip each bike with one, but the company that actually makes them couldn't supply enough to meet the production demands. So in its place is a useful but less-practical luggage rack. Venturer owners will have to buy aftermarket trunks on their own, but YPDI spokesmen say that an OEM trunk is planned for 1982 turn-key touring Yamahas.

Even without the trunk, though, there's plenty of space in the two fiberglass saddlebags. New bracketry repositions the bags closer to the bike than last year's Eleven offerings; and side-hinged lids replace the fully detachable lids that too often fell off of pre-1980 YPDI bags. Unfortunately, there's not enough room in the bags to stow your helmet, so you'll have to leave that job to the helmet lock on the side of the motorcycle.

Yamaha turn-key development didn't involve just adding pieces to the stock Eleven; in the interest of increasing the riding range, the gas-tank capacity grew from 5.8 to 6.5 gallons. Those supertanker specs will allow you to cover more than 300 miles between fuel stops—a distance that surely is more than your buttocks can stand, even with the new contoured bucket seat that parks you about an inch and a half closer to the ground than before. And to help support your load of traveling gear, the shock springs have been up-rated so they won't sag as easily when overworked. The shocks themselves have the same four-way-adjustable rebound damping and five-way-adjustable spring preload as on previous XS Elevens.

Not so the shorty mufflers on the Venturer, which were grafted from the Eleven Special for cosmetic purposes only. These upswept pipes presented a potential problem, however, in that they empty the exhaust right toward the bottoms of the saddlebags. So to avoid hot pants in the luggage compartments, metal heatshields are rubber-mounted to the bottoms of the bags. They provide a buffer air space between the saddlebags and their contents, hopefully preventing the Eleven's BTUs from incinerating your BVDs.

Things like that offer strong evidence that the Venturer isn't Yamaha's final solution to turn-key touring for the wandering masses. But the bike does underline the significance that touring currently has in the marketplace. Whether the hard-to-say name "Venturer" remains after the 1981 season will be determined by Yamaha's product planners, but the verdict on the bike's *concept* is up to the public. If past YPDI sales records—and those of Honda's Interstate, as well—are any indication, that verdict is already in. —*Dain Gingerelli*

PHOTOGRAPHY © 1981 DAVID CLARK

Continued

BETTER THAN STOCK:

Yamaha XS1100 Special

Think of it as the After Midnight Special.

• I admire the way the XS Eleven works. Its muscle-bound torque curve perfectly suits long afternoons crossing large expanses of real estate. The problem is, the Eleven Special isn't suited for speed unless you're strictly a vertical rider. And for a bike that's so American in its looks and the way it works, that philosophy excludes those of us who want to take advantage of everything an American road atlas has to offer. So our 1980-vintage Special became a prime candidate for a better-than-stock project, an attempt to build a better balanced motorcycle that would be capable of cruising comfortably but also capable of sinking its claws into the pavement whenever the time came for radical riding.

A central part of making the Eleven more comfortable for distance riding involved changing the riding position. Still, I wanted to preserve the bike's American styling. And by fitting the seat, rear fender and mud flap from the '79 Special to this 1980 model Eleven Special for a cost of $112 and attaching the handlebar from a Suzuki GS850G for $15, the Eleven Special actually removed itself from the profiler ranks and became even more classic and traditional than before. Furthermore, the thicker seat from the '79 Special did a better job of insulating me from road harshness while the conventional handlebar provided a riding position in keeping with long-distance riding.

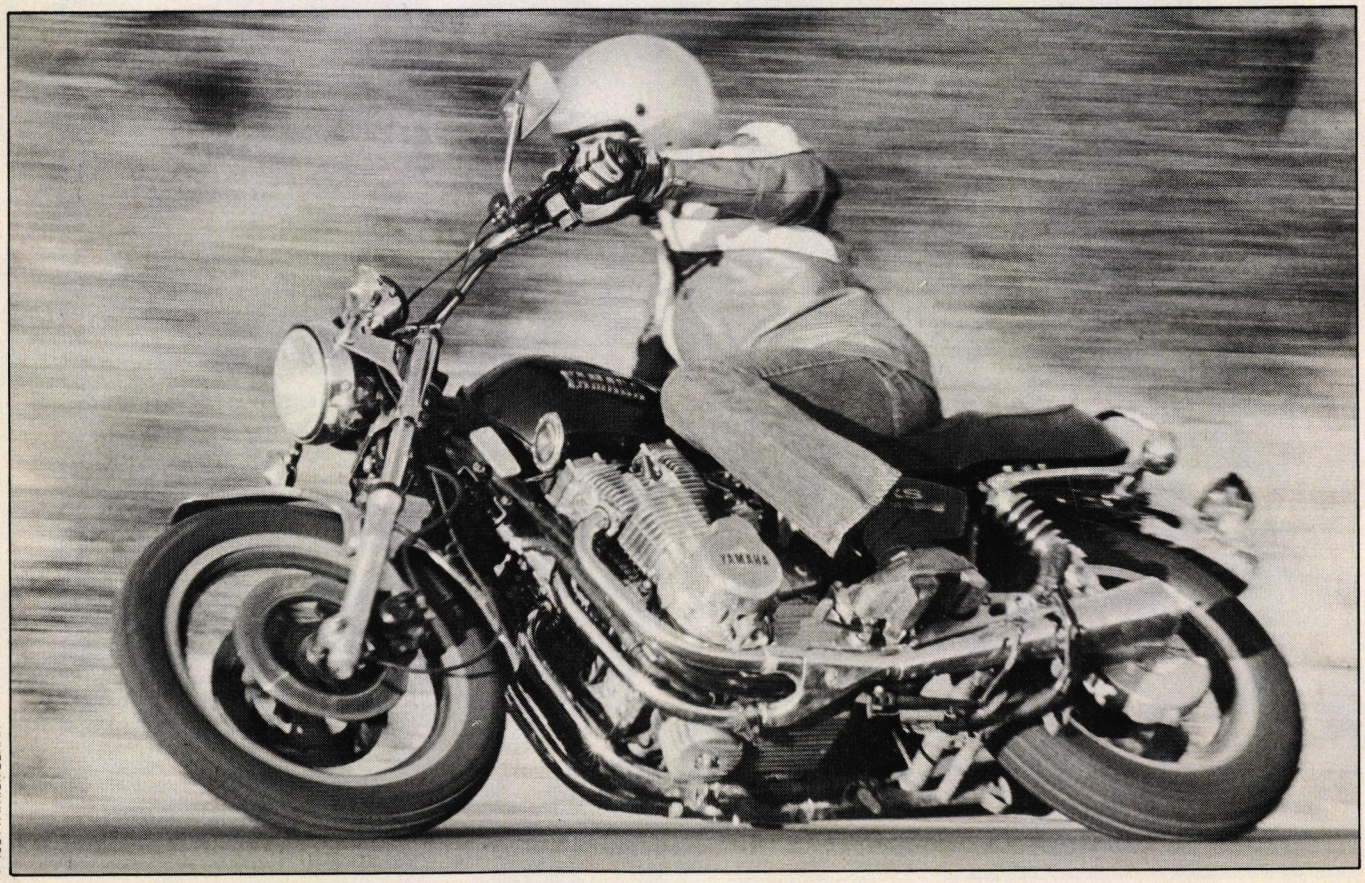
To keep the Eleven Special cool when the temperature and the speedometer are both running at about 85, I fitted the oil cooler from the 1981 Venturer which is identical to the oil cooler fitted to all European Elevens. At $246 it is three times as expensive as an aftermarket item—and lacks thermostat control besides—but the radiator and lines bolt up to the sump and the frame downtubes.

Interpart's Mulholland Force 1 air-spring shocks gave the Eleven better footwork on freeways and backroads alike. Just like an air-spring fork, the progressive spring rate allowed the rear end to absorb small inputs with aplomb, eliminating much of the choppiness from the Eleven's ride, while providing enough control to keep the bike locked into 80-mph sweepers. The Eleven's rear-end jacking was greatly reduced as well. Plastic air lines connect the handlebar-mounted pressure gauge with the shocks, and you can bleed air from the system while in motion thanks to a clever button on the gauge-mounted Schraeder valve. Soon Interpart will make on-board air compressors available so you can fill the system while in motion as well. Interpart had some quality control problems with the first run of Force 1 shocks, but the design has been upgraded with better shaft seals and damping oil. Furthermore, the $195 Force 1s carry a three-year unconditional guarantee, making them a bargain.

The core of the Eleven Special's new-found high-performance personality are the V-rated Pirelli Phantom tires we obtained from Tom Hayner's Racer's Supply, the west coast distributor. Pirelli makes the only 16-inch rear tire with a high-performance profile that we know of. The Special's cornering habits were transformed; everyday 40-mph corners were negotiated without the Eleven's usual squirming and there was enough grip to wear the centerstand to a nub if I desired.

With these few judiciously applied tweaks, the Eleven Special no longer felt like a 600-pound albatross whenever I turned off Bomber Boulevard. Yamaha's engineers designed the Eleven with more than midnight cruising in mind, and the After Midnight Special lives up to the performance potential they built into this bike.

—Michael Jordan



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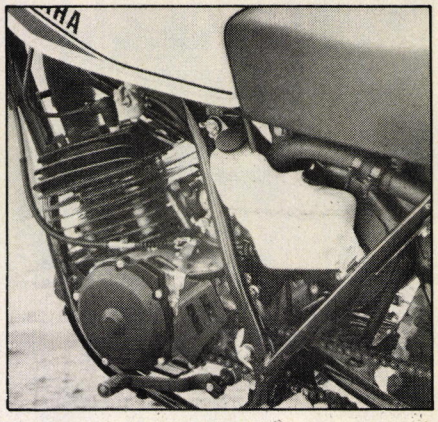
MINITEST:

Yamaha MX175H

Entry-level playbike for the slight of skill and the light of wallet.



Oil-injection tank, a rarity these days

Low tech but even lower in maintenance.

• It's easy to forget that dirt bikes like the MX175 even exist. Especially if you happen to be caught up in motocross or enduros or any kind of off-roading in which high technology is the ante for success. But exist they do. And in this peculiar strain of imminently forgettable motorcycles called "playbikes," the MX175 is one of the more memorable offerings.

Not that you'd ever figure that out just by looking at the thing. After all, its noticeably short wheel travel and spindly looking fork legs hardly impress, just as its unusual lowness and shortness seem out of step in a world which currently marches to the tune of yard-high seats and five-foot wheelbases. But that's the very point of this machine, really, for despite the "MX" designation in its name, it was never intended to whet the go-fast appetites of speed-hungry hotshoes; it's merely a light, small, simple, easy-to-ride, inexpensive motorcycle that's just the dirt-riding ticket for people who—due to their lack of size, age, experience and/or income—are far less demanding.

Not surprisingly, then, the MX175 often gets caught with its technological pants down when pressed to full WFO limits. But when ridden at something reasonably short of that pace, the little white Monoshocker does an admirable job, indeed. It has suspension of adequate quantity and quality to smooth out most of the undulations that less-aggressive types are likely to ride over. And the short, low and light physical nature of the bike make it almost as easy to maneuver as your sister's ten-speed. Best of all, perhaps, is the fact that you don't have to be built like an NBA center just to plant both feet firmly on the ground when straddling the saddle. All of which adds up to a responsive yet unintimidating motorcycle that is ideally suited to people who still are carrying their dirt-riding learner's permit.

You'll find nothing about the 171cc engine, either, that detracts from the MX175's quiet friendliness. In fact, this oil-injected, reed-valved two-stroke undoubtedly is the most lovable part of the entire motorcycle. It's not as powerful, obviously, as all of the competition-oriented motors that populate the 175 class; but it nonetheless propels the 200-pound MX175 at a more-than-respectable rate simply by cranking out a steady supply of usable, predictable power everywhere in its wide rpm range. And with the inherent responsiveness provided by the 24mm Mikuni carburetor—a small venturi by class standards—the engine is willing to lug down to extremely low revs as though it were some sort of two-wheeled tractor. That's a trait that can often prove invaluable in helping neophyte riders out of the I-can't-get-up-this-hill trouble they're so fond of getting into. And as a further insurance that a proper dosage of rear-wheel torque will be available in just about any situation, the MX175's gearbox has a half-dozen ratios to choose from, just like on 175cc race bikes.

Six speeds or not, though, the berm-shooters and trail-breakers of the world are bound to scoff at the MX175, citing that its shortages of virtually every important performance commodity render it a non-serious "toy." And maybe they're right. But those self-proclaimed marketing experts ought to know that they're clearly in the minority when the discussion is about *this* particular toy: Yamaha reports that the MX175 appears to be standing firm as the fourth- or fifth-best-selling unit in the company's 15-bike repertoire of dirt-only motorcycles, and that it outsells every YZ motocross and IT enduro model except for the YZ125.

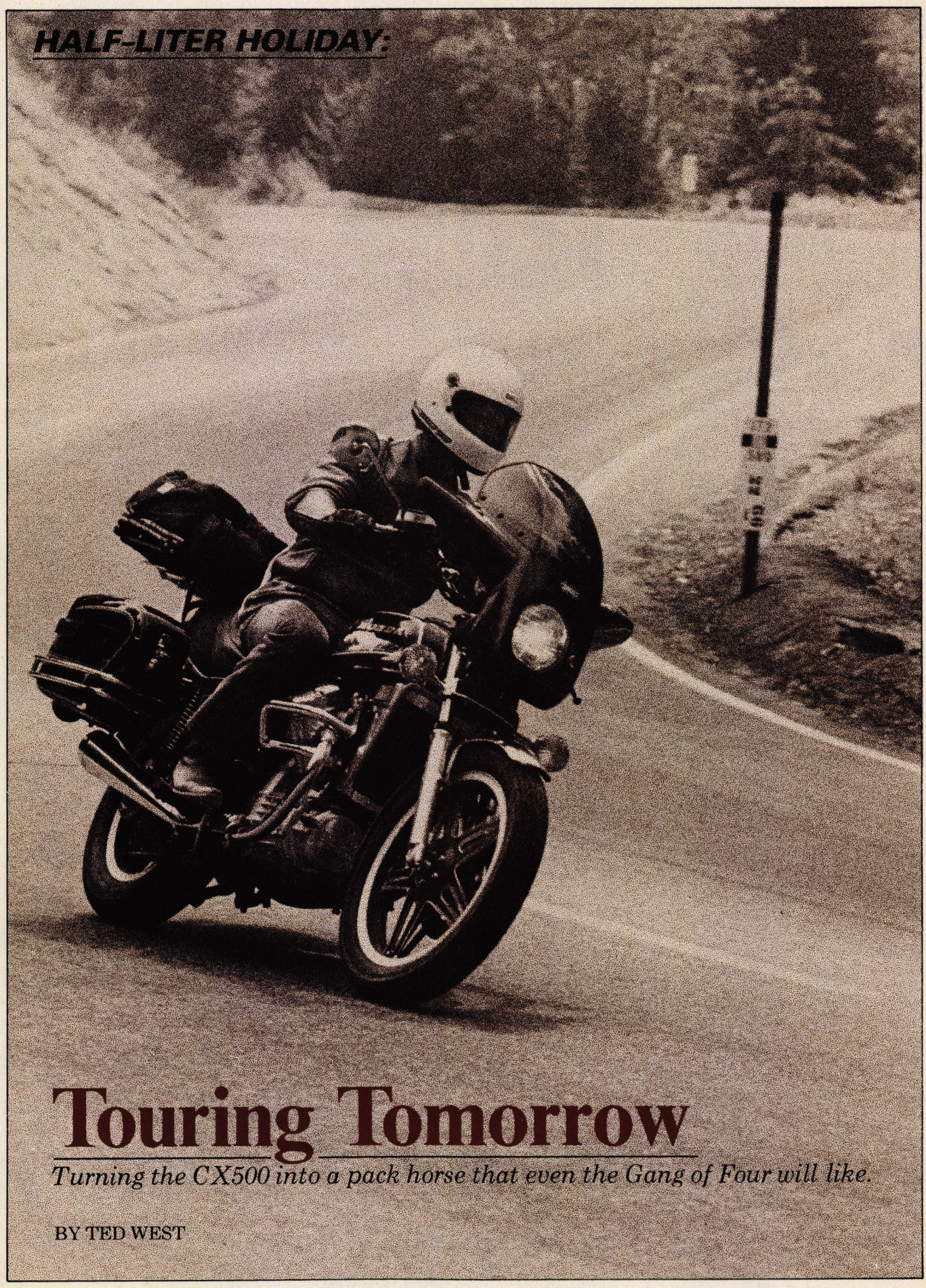
We can't speak for you, but that sounds like a pretty serious motorcycle to us. —*Paul Dean*

YAMAHA MX175

IMPORTER: Yamaha Motor Corporation, U.S.
6555 Katella Avenue
Cypress, California 90630

Suggested retail price:	$1079
Engine type	two-stroke vertical single
Port arrangement	one reed-valve-controlled inlet, four main transfers, one booster transfer, one exhaust
Bore and stroke	66.0mm x 50.0mm
Displacement	171.1cc
Carburetion	one 24mm Mikuni slide / needle
Gearbox	6-speed
Front fork / wheel travel	32mm stanchion tube diameter / 6.0 in. (152mm)
Rear shocks / wheel travel	5-way adjustable preload / 5.5 in. (140mm)
Wheelbase	52.0 to 53.8 in. (1321 to 1367mm)
Seat height	31.5 in. (800mm)
Weight	200 lbs. (91kg)
Top speed (observed)	61 mph (98 kph)

HALF-LITER HOLIDAY:



Touring Tomorrow

Turning the CX500 into a pack horse that even the Gang of Four will like.

BY TED WEST

PHOTOGRAPHY © 1981 DAVID DEWHURST

You've got to go out back during lunch hour, way out behind the Research & Development garages, to hear the truth. But what you hear out there, between the bologna and cheese, is that the motorcycle manufacturers know damn well it won't last forever. Much as we Americans love our hyperbikes, the love affair with cubic inches is becoming strained.

The causes of discord aren't hard to see. Just go out and buy a hyperbike and they'll become obvious to you in the first hour. Finance companies don't like you, insurance companies hate you, and the cop with radar between Mitzi's Grille and the Kresge store absolutely *loves* you. As if these three adversaries weren't enough, the federal government has taken off her glasses, set her square jaw in that talkin'-turkey grimace, and as much as declared she isn't going to let us go on *doing* this to ourselves! (Ah, dear Ms. Claybrook, how relieved she would be if we all came to our senses like her and began riding balloon-tire Schwinns.)

But like it or not, the writing is on the wall. It's even on our speedometers. One-liter lightning is only a summer storm.

And the manufacturers know it. If you doubt it, just take another look at that fuel-injected, turbocharged half-liter Honda on page 33. The private mutterings in board rooms these days has it that the future of motorcycling lies somewhere between 500cc and 750cc. You needn't ask officially, of course, because they won't know what you're talking about—bad marketing policy. They don't want you thinking all their big bikes are going to disappear from the showroom floor as of next Tuesday. (Indeed, they won't.) But it seems logical to them that the combined effect of high insurance and finance rates, the price of gasoline, ever-increasing scrutiny by the federal government, and the rising price of hyperbikes themselves, is gradually going to make big bikes less attractive to the buying public. Current sales figures already reflect that fact.

But that leaves us with what? you hyperbikers snap—*mopeds*!

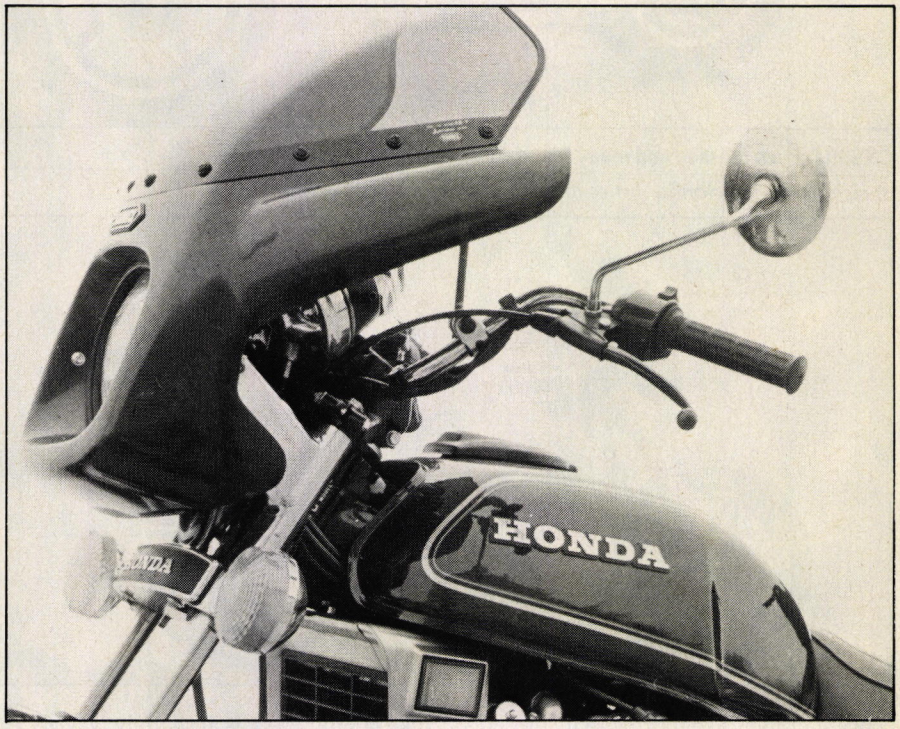
Get hold of yourself. I remember a time not long ago when a 500cc bike was considered dangerously big, just about too much for any one man to handle. My first bike was a 500cc BMW and it took the neighbors a good two weeks to believe the thing wouldn't start plowing straight through brick walls just for the thrill of it. There were 750s available at the time, too, of course, but only madmen and Marines volunteered for such lethal devices.

Which is to say, a little historical perspective is going to come in handy in the next few years. And besides, anyone who can't have a good time riding a modern 750 wouldn't recognize a good time if it kneed him right in the collection.

No, the irony is that the gradual receding of hyperbikes from the scene probably won't affect your E.T.s between Mitzi's Grille and Kresge's by much more than a couple tenths of a second, if that. The real test of the transition to smaller bikes will come when you strap on saddlebags, a fairing and your favorite traveling lady, then head for the horizon.

See, ordinarily most of us don't think of it this way, but the one place where cubic centimeters really prove their worth is on tour. Especially if you're heavily loaded, especially if you're two-up—and even more especially, if you're at high altitude.

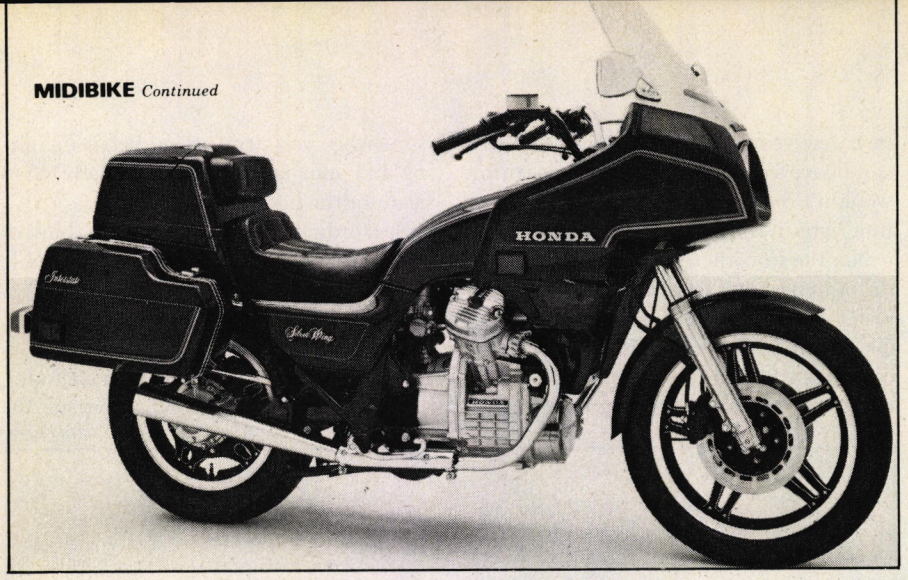
So CYCLE GUIDE decided to pursue the



A Shoei to cheat the wind, saddlebags and Tour Pack to carry the load

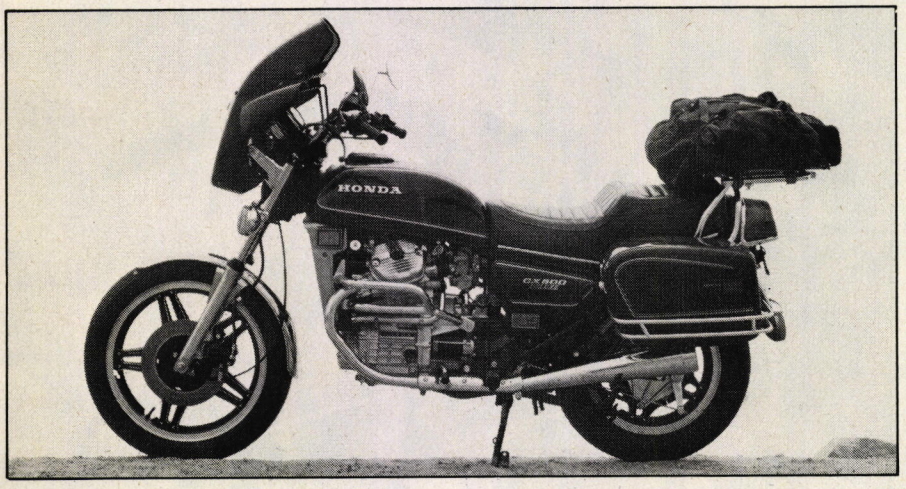
One man's vision of solo touring hardware.

Continued



CX500 Deluxe dressed and ready for one-up cross-country prospecting

A rich vein that Honda mines with the Silver Wing Interstate.



concept of midibike touring to its present-day end. From the first, we realized that the choice of a bike would be critical. It would be too easy, for instance, to choose one of the new 750s. As I've already said, modern 750s come so close to the liter bikes in performance that you probably can't learn much anyway.

No, if you honestly want to test midibike touring, you have to select a bike somewhere near the bottom of that cubic-centimeter range. At the same time, in fairness, it has to be a bike that isn't basically ill-suited to the demands of touring in the first place.

So of course we chose the Honda CX500.

I probably don't need to tell you that, in these air-cooled multi-cylinder days, the CX500 is a very iconoclastic motorcycle. That it employs a vee-twin is unusual. That it employs shaft drive is fairly unusual (though less and less so, it seems) and gives it obvious advantages for touring. That it is watercooled is *quite* unusual, but gives it the important advantage for touring of assuring adequate cooling at high altitudes, a serious problem with some air-cooled engines. But the fact that all of these characteristics are supplied in a bike of only 500cc is absolutely *bizarre*. In fact, the CX500 doesn't really feel like a 500 at all. By comparison, Kawasaki's lithe, crisp little KZ550 feels like a mini-bike. The CX500 just seems too "big" for a 500, as though it were some crypto-750 that nobody will quite own up to.

On the other hand, despite all of its seemingly un-500-ish heft, the CX500 is one hell of a nice ride. It is comfortable, it accelerates, corners, stops beautifully and *sounds* like the Boston Symphony. And judging from the number of CXs on the road, a lot of riders approve of that particular mix of fine qualities.

The point of the touring test, however, was to find out if, after three weeks and several thousand miles of open road, the CX was *still* a hell of a nice ride . . . or if it would drive me to hijacking some guy's Tour-Glide in mid-Montana and disappearing into a life of crime.

To reduce the need for a hijacking as much as possible, we did everything we could to make the CX500 a promising mid-touring package. First, we fitted Hondaline saddle-bags. At first glance, they seemed a bit on the small side, thanks to the limited space afforded by the CX's stylishly upswept pipes. But once I began packing up, they proved to hold a surprising amount of gear. Hondaline also supplies a handy cloth liner with the bags, allowing you to simply pick up the liner by the straps and haul it off to your motel room like a sack of groceries. The tops of the bags showed a definite reluctance to stay locked in place, though.

For added storage space, we affixed a luggage rack to the CX and obtained Tourmaster's cavernous Tour Pack. Because this unit is cloth, it can't really be locked, and you're obliged to take it with you whenever the bike is parked out of your view. But Gawdamighty, how much *krep* you can stuff into the thing! Embarrassing as it is to admit, between the Tour Pack and the Hondaline bags, I actually had *too much* space and never came close to using it all at any time.

For riding comfort—while also trying to avoid pushing so much air that the poor half-liter engine wouldn't have a prayer—we mounted a Shoei FM-2 fairing to the bars. This unit, besides looking like a million dollars, had the welcome effect of keeping the wind off my chest, though it didn't go quite so far as to keep the wind out of my face.

Finally, with the addition of the admirably simple Vista-Cruise throttle control and the promise of an unlimited gas allowance, I was ordered to hit the road. "Get outta here," they said, "don't want to see you around here for three weeks."

Well, here's the truth. In three weeks—and more—I put the CX500 through every kind of touring terrain I could think of, from flat monochrome freeway droning, to canyon peg-grinding, to roasting mid-summer desert hell, to foggy 7000-foot mountain-goating, to just plain going for all I was worth down Big Sur as if I had KR's girl out back and King Kenny was chasing me himself with a Smith & Wesson. My riding habits were sufficiently varied that the same tank of gas that took me 180 miles in one part of the trip was good for only 127 miles in another. I rode one-up, two-up and on occasion, if you consider that the weight of two riders' gear is nearly equivalent to a third person, three-up. And in all of that time, under all of those conditions, in all of my moods, I always came to the same amazing conclusion—namely, that the Gang of Four at the loan office, the insurance store, the City Jail and Ms. Claybrook's Perrier party, can't touch us. The future *works*.

Well, mostly.

See, there's no fooling Father Physics. Five-hundred cubic centimeters, no matter how willing and well-intended, simply

is *not* 1000 cubic centimeters. As a result, with half-liter touring there are differences. For instance, when you're riding at 65—shame on you, heathen—and you want to get to 75 in a hurry, you're going to have to notch the tranny down a cog. When you get up into four-digit elevations, you might have to drop it down *two* cogs. And when you get into the high four-digit elevations, you just might never get to 75 at all . . . unless, of course, you jettison your lady at Spruce Corners and tell her you'll be back in three days.

But she's got too much self-respect and too nice a pair of Levis to still be there when you get back. Better just to chug on upward at 68 miles an hour till you get to the top of the pass. Won't be long. And you're going a good 10 miles an hour faster than the cars, anyway.

Yeah, half-liter cruising is a little different from one-liter cruising, no denying it. But it's still touring, and I might add, *good* touring. Anyone who's done a lot of it knows that the point of touring isn't speed, anyway, but seeing and feeling. You can see the world from a car, but only on a motorcycle can you *feel* it. And while touring on that CX500 for three weeks (which, I bashfully confess, turned into five weeks), I didn't miss a thing.

But the guys at Honda must've known I wouldn't miss anything beforehand, because shortly after my return they announced a new model they'd been working on all along. They are so certain of the efficacy of midibike touring that, for 1981, they've produced the GL500, a Gold Wing Interstate version of the CX500 they call the Silver Wing Interstate. It will have all the split-level ranch-style touring conveniences of the Interstate, but slightly reduced in scale to suit the CX500 package. Huzzah, I say.

And if that isn't enough to set your midibike imagination running amok, think back to that Turbo Honda for just a second. Now I ask you, what could be more delicious than a medium-sized, efficient 500 that performs like a 1000?

In the meantime, though, if you're looking for a way to go long-hauling but you don't have enough cold cash to swing it, not to worry. Don't punch out the Loan Officer if he turns down your hyperbike loan, just take a step back from him and smile. Then say, "Well, then, what about a nice *little* bike?" and show him a picture of a miditourer. But when he replies, "Now that's being more sensible, son," don't nod, don't grin, don't breathe. Don't tell him that midibikes are still motorcycles. Just take the money and run. He never needs to know the truth. •

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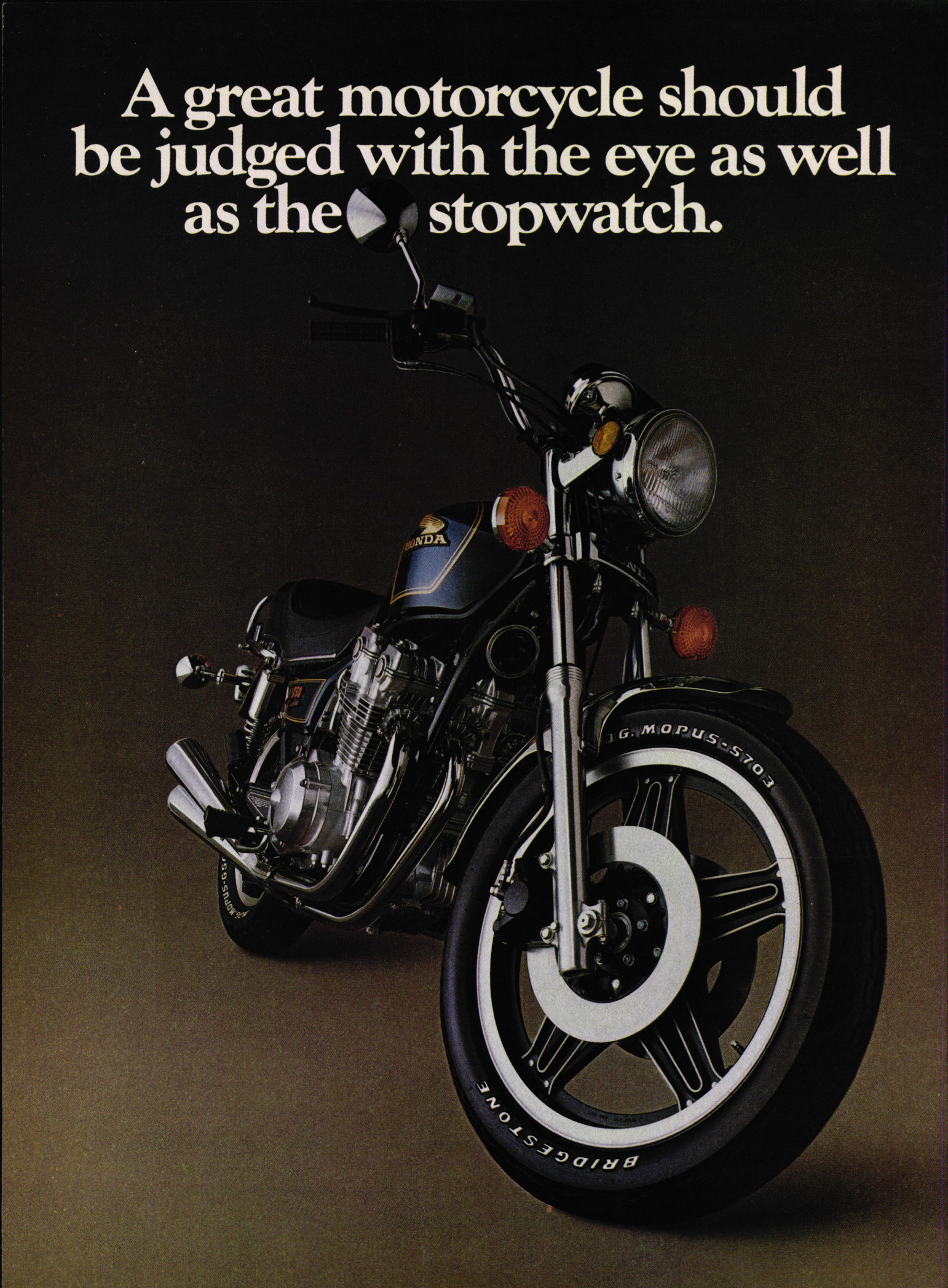
Motorcycle Mechanics Institute

A great motorcycle should be judged with the eye as well as the stopwatch.



The quarter mile might tell you how fast a motorcycle can move, but there's something it can never tell you.

How much a motorcycle can move you.

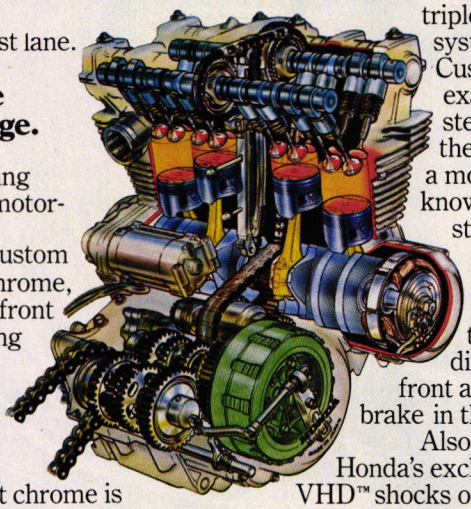
Honda presents the 1981 CB750 Custom, one of the most beautiful motorcycles to ever roll out of the showroom.

Or into the fast lane.

Chrome on the range.

This is a shining example of how a motorcycle should look.

The CB750 Custom is a symphony of chrome, from the gleaming front fender to the glowing taillight.



Perhaps the most advanced custom 750 on the road.

And what isn't chrome is the deepest richest paint you've ever seen on a production machine. In fact, to get two-tone paint like this, you either buy a Honda Custom or you buy a custom paint job.

But underneath all this dazzle, don't be surprised if you discover a slightly aggressive attitude. The CB750 Custom rides on clean lean ComStars™ and big fat tubeless tires with raised white letters.

Like a muscle car on two wheels.

Rakish new leading axle forks with dual disc brakes.

Lean back and enjoy the performance.

Now you've arrived at the most beautiful part of the CB750 Custom.

Riding it.

The handlebars and footpegs let you lean back comfortably instead of hunching forward.

The saddle sinks you down to just 29.9 inches off the ground. So you don't have to stand on tip-toe at stoplights.

Stretching out in front, the new leading axle fork gives you more than a rakish look. It's air adjustable, so you can tune it to load and road conditions. The ingenious offset triple steering clamp system lets this Custom retain almost exactly the same steering geometry as the Honda CB750F, a motorcycle well-known for its ability to straighten curves.

And because stopping is as important as going, there are now dual disc brakes in the front and a brawny drum brake in the back.

Also in back, Honda's exclusive VHD™ shocks offer you five spring preload settings – from limousine plush to road racer stiff.

And a swing arm pivot fitted with needle bearings reduces flex in tight corners.

The result of these refinements is a motorcycle that can handle almost anything from a hairpin curve to a double S. Luxuriously.

Even its muscles have muscles.

You're looking at the technological cousin of Honda's famous superbike racers.

It features 749 cc's of four-stroke, four-cylinder power, complete with high tech touches like no-maintenance transistorized pointless ignition, double overhead cams, multiplate cam chains and a forged crankshaft with Kelmet racing bearings.

Inside the cylinder heads, you'll find Honda's unique Pentroof™ combustion chambers. With a direct valve system that reduces maintenance and four valves per cylinder, instead of two, to reduce valve float and improve breathing at higher rpm's.

Which translates into considerably more power at higher rpm's.

And to make sure you get all that power, smoothly and without waiting, the four 30 mm CV carburetors are fitted with an accelerator pump for quick, crisp throttle response.

Just roll it on.

Tricks and treats.

The CB750 Custom is beautiful in big ways.

It's beautiful in small ways, too.

This year there's a quartz halogen headlight and new trick instrument lighting that doesn't just light up. It glows. Vibration-absorbing passenger footpegs. There's even a vacuum operated fuel petcock that you never have to remember to turn on or off.

But this is just the icing on the cake. Without a single gadget, this motorcycle combines pure beauty with brute force so well that you don't know whether to polish it or polish off the competition.

The CB750 Custom.

A moving experience even when it's standing still.

HONDA

FOLLOW THE LEADER

ALWAYS WEAR A HELMET AND EYE PROTECTION. Specifications and availability subject to change without notice.

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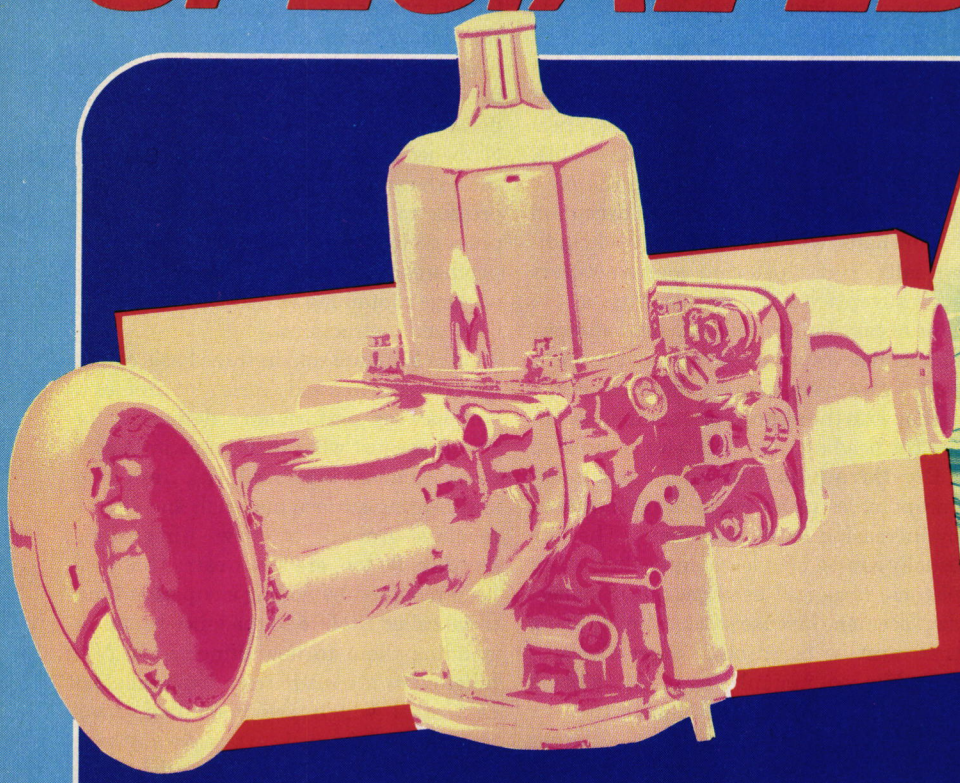
Cycle Guide's

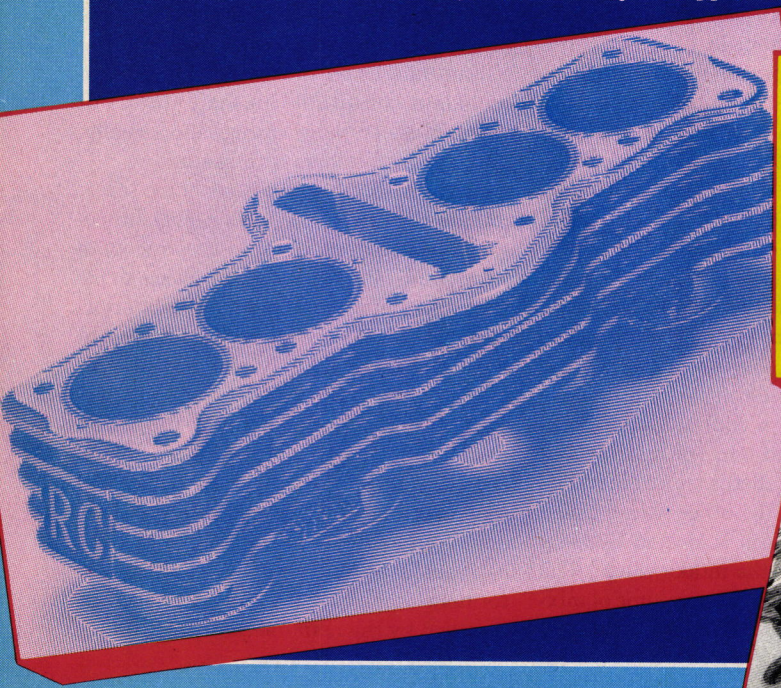
SPECIAL EDITION

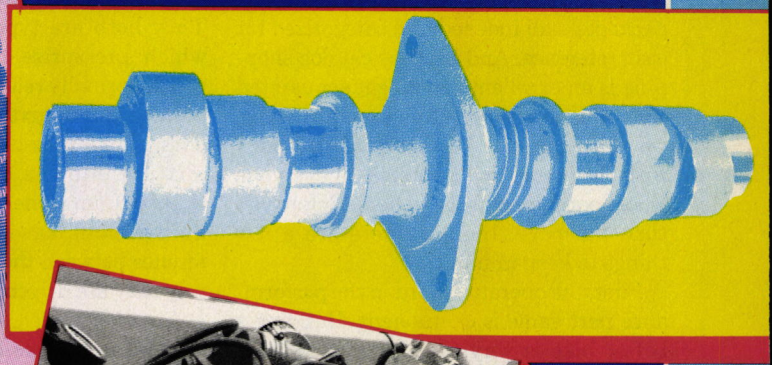


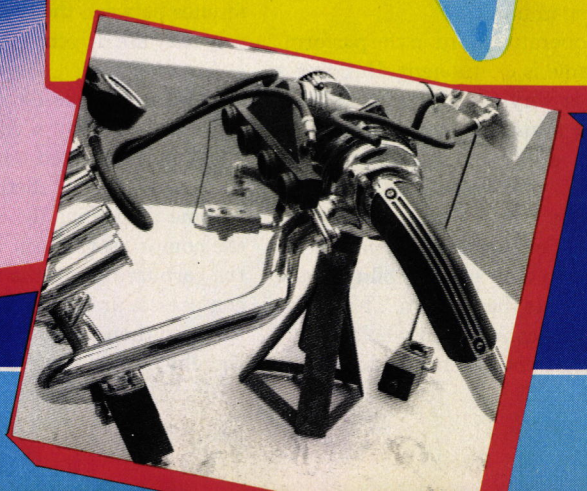
HIGH-PERFORMANCE ENGINE KITS

★ BIG-BORE KITS ★ STROKER KITS ★
★ TURBO- & SUPERCHARGER KITS ★ CAM KITS ★ CARB KITS ★
★ COMPLETE ENGINE PACKAGES ★

Who makes them, what they fit, what they're supposed to do, how much they cost and where to get them!







High-Performance Engine Kits

• There are two kinds of *fast* in the motorcycle business. One the manufacturer delivers stock to the showroom floor; the other you have to buy as a performance option. Stock bikes today deliver plenty of horsepower—for most people. But there is a segment of the riding population for whom that just isn't enough. For these riders, no matter how big the bike, it's never quick enough if it's still stock.

That speed greed isn't anything new, though. Remember the musclecar days of the Sixties? Big Dodges, Fords and Chevvys with hood scoops, outrageous horsepower and cranks turning fast enough to grind glass? Well, those times may have passed for four-wheelers, but this Special Edition is here to tell you that the performance industry is alive and well and living in the motorcycle world.

That world, moreover, is not populated entirely by raw-speed seekers. The motivations behind changing or altering engine components are as wide and varied as the people—and the machines—involved. Improving power-to-weight ratio, for example, is an elementary engineering pursuit for a better motorcycle. And as long as man has toyed with mechanical devices, he has always searched for ways to make them better. Cost considerations enter into the picture, too, because sometimes those who need more power can't afford to move up to a bigger bike.

Whatever the reasons for considering engine modifications, two questions must be answered at the outset: What do I need? and Where can I get it? That's where this Special Edition comes in, for on the following pages we've assembled as complete a look at the performance aftermarket as space allowed. In it you'll find everything from component kits to complete engine packages—all indexed and categorized for easy reference. And because catalog shopping is an excellent way to get acquainted with a manufacturer's full line of products, we've included a Directory at the back with the names and addresses of everyone whose equipment is listed here. Before you turn the page, though, there are a few things to keep in mind.

First, the operative word in the performance part game is *component*. Building a better bike is very much like building a home sound system—except that Kenmore tuners and BSR changers aren't likely to flatten your eyeballs on a straightaway. Basically put, the performance obtained by most engine modifications is directly related to their compatibility to the stock components that remain. That's why it's important to consider the whole motorcycle and what you intend to do with it before ordering any high-test parts. Don't be afraid to consult your dealer or call the manufacturer for advice. And don't just pop for the trickest setup in the catalog; it may not be right for your bike, and could actually hinder performance as a result.

Second, we have purposely limited this guide to what are commonly referred to as "kits." Had we listed every single high-performance engine piece that is available, this guide would have read like the New York City phone book. The one exception is camshafts, which are generally sold individually. But most cam manufacturers suggest replacing the valve springs at the time of camshaft installation (and also recommend new spring retainers and keepers, too), so we have lumped these pieces together with the appropriate companies under the heading Cam Kits. Our categories:

• **Big-Bore Kits** spice up the real meat-and-potatoes of an engine's performance by increasing its displacement. The kits usually consist of at least larger-than-stock pistons, rings and head gaskets. Smaller-displacement kits use stock cylinder liners that must be bored out. Larger-displacement kits require replacing the stock liners with thicker ones and machining the new cylinders to accommodate the larger pistons. The largest big-bore kits are generally offered for racing only, and some of these require the use of a complete aftermarket cylinder-block assembly.

• **Stroker Kits** also increase displacement, but do so by means of a remachined crankshaft with a relocated crankpin(s). The kits usually consist of a complete modified crankshaft assembly, and occasionally, beefed-up connecting rods.

• **Turbo- and Supercharger Kits** perform basically identical tasks, although they accomplish them in different ways. They both are types of air compressors which pressurize the intake manifold, which normally relies only on a partial vacuum to draw mixture into the cylinders. This intake pressure forces more air/fuel mixture into the combustion chambers than vacuum alone could suck in, thus producing more horsepower. The major difference between the two devices lies in the way they are driven.

A *turbocharger* consists of two paddle wheels, each enclosed in its own housing but connected by a common shaft. Exhaust gas is directed into one housing and spins one wheel, called the turbine. The turbine then spins the other wheel, called the compressor, which is located between the carburetor and the intake valves. The compressor draws in a large volume of mixture and then *rams* it into the intake tract, thereby providing what is called "boost" to the intake system.

Rather than being driven by exhaust gases, a *supercharger* is coupled directly to the engine by means of either a toothed Gilmer belt or a roller chain. As a result of this direct drive, superchargers are not plagued by the throttle lag that is common to turbochargers. This lag simply is a slight delay in achieving boost when the throttle is opened, and it's caused by the need for the exhaust gas to "speed up" the compressor to the point where it can create pressure in the intake. Each turbo- or supercharger kit is sold as a complete bolt-on package containing all necessary hoses, fittings and instructions.

• **Cam Kits** are sold in three basic configurations and in a wide variety of profiles to suit varying performance demands. *Regrinds* are just what their name implies: A stock camshaft is refaced with fresh lobe- and bearing-surface material, and then is machine-ground to new dimensions. *Hardwelds*, too, are stock cams that have been modified by adding a superhard material called Stellite to the lobes before regrinding them to new dimensions. *New billet cams* are made from fresh billets of cast steel which are machined, heat-treated, straightened (to remove any heat-treating distortion) and then polished.

Aftermarket camshafts either open the valves further, longer, at different times or all of the above. Most manufacturers offer basic outlines of the kinds of power each of their cams will provide. But be careful; while some cams require no other engine modifications, others are made expressly for engines in various stages of high-performance development. So do your homework beforehand to learn what cam your engine really needs, rather than the one *you* think it needs.

Cam kits listed in this Special Edition include a substitute camshaft (or set of cams) plus new valve springs and, usually, alloy spring retainers with keepers.

• **Carb Kits** are comprised of an aftermarket carburetor (or set of carbs), intake manifolds (if applicable) to accommodate adaptation, any necessary hardware to install them, and sometimes new air filters as well. The idea is to achieve better breathing and a more suitably matched level of performance between other components.

• **Engine Packages** are offered by most major engine-component makers. These consist of groups of components which the manufacturer recommends as a performance combination. These component kits can usually be purchased over-the-counter for home hookup or, in some cases, can be installed by the manufacturer.

All for a price, of course.

continued

Big-Bore Kits

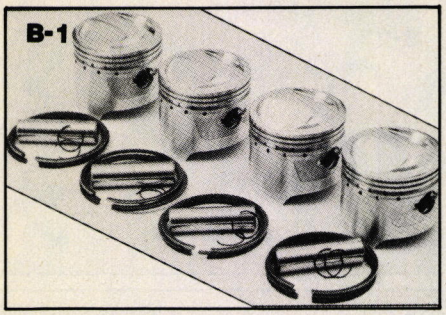
MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Action Fours Permanent mold cast pistons made in three-piece molds of special high silicone content alloy. Some high-compression and turbo piston sets are available.	570cc kit	B-1	Honda CB500	$169.95
	590 & 601cc kits	B-1	Honda CB550	169.95
	590 & 601cc cylinder sleeves	B-1	Honda CB550	82.95 + labor
	811 & 836cc kits	B-2	Honda CB750	149.95
	811 & 836cc kits	B-2	Honda CB750 F-2 (factory large valve head)	159.95
	717cc kit	B-4	Kawasaki KZ650	179.95
	1015cc kit	B-4	Kawasaki KZ900	179.95
	1075cc kit	B-4	Kawasaki KZ1000	179.95
	1075cc cylinder sleeves	B-4	Kawasaki KZ1000	89.95
American Turbo-Pak Forged alloy low compression turbo pistons. Specially designed by ATP for optimum turbo performance.	820, 836 & 970cc Turbo kits	B-5,6	Honda CB750 (SOHC)	194.50
	810, 823 & 954cc Turbo kits	B-5,6	Honda CB750 (DOHC)	194.50
	717cc kit	B-6,6	Kawasaki KZ650	194.50
	958, 1016, 1042, 1075, 1103 & 1200cc Turbo kits	B-5,6	Kawasaki KZ900	194.50
	1042, 1075, 1103 & 1200cc cylinder sleeves	B-5,6	Kawasaki KZ900	110.00
	1016, 1042, 1075, 1103 & 1200cc kits	B-5,6	Kawasaki KZ1000	194.50
	1103 & 1200cc cylinder sleeves	B-5,6	Kawasaki KZ1000	110.00
	870cc Turbo kit		Suzuki GS750	194.50
	1055cc Turbo kit		Suzuki GS1000	194.50
	1150cc Turbo kit		Yamaha XS1100	194.50
Competition Engineering Specially designed aluminum alloy pistons. Most kits are available in both standard and high-compression.	1075 & 1200cc kits	B-8	Kawasaki KZ900	435.00
	1075 & 1200cc kits	B-8	Kawasaki KZ1000	435.00
	998cc kit	B-9	Suzuki GS750	435.00
	1085 & 1176cc kits	B-9	Suzuki GS1000	435.00
Harley-Davidson	1340cc kit	B-10	Harley-Davidson 1200 '78 & earlier	549.00
M & M Racing Forged alloy pistons available in both street (std. 10.5:1 compression) and racing (high-compression 12.5:1) configurations.	820 & 836cc kits	B-11	Honda CB750 (SOHC)	192.00
	900, 970, 1000, 1030 & 1080cc kits	B-11	Honda CB750 (SOHC)	272.00
	810 & 825cc kits	B-12	Honda CB750 (DOHC)	194.00
	850, 875, 901, 955, 982 & 1010cc kits	B-12	Honda CB750 (DOHC)	275.00
	1062 & 1130cc kits	B-13	Honda CBX	292.00
	1165cc kit	B-13	Honda CBX	462.00
	700 & 720cc kits	B-14	Kawasaki KZ650	192.00
	740, 760 & 780cc kits		Kawasaki KZ650	272.00
	960, 1013, 1042, 1075 & 1103cc kits	B-15	Kawasaki KZ900	192.00
	1132, 1170 & 1200cc kits	B-15	Kawasaki KZ900	272.00
	800 & 870cc kits		Suzuki GS750	192.00
	920cc kit		Suzuki GS750	272.00
	870cc kit		Suzuki GS850	192.00
	920cc kit		Suzuki GS850	272.00
	1055 & 1085cc kits	B-16	Suzuki GS1000	192.00
	1115 & 1150cc kits	B-16	Suzuki GS1000	272.00
	1105 & 1135cc kits	B-16	Suzuki GS1100	194.00
	1170 & 1200cc kits	B-16	Suzuki GS1100	275.00
M.T.C. Engineering Forged pistons made of a special alloy which contains no silicone. Most kits are available in three and some in four versions: Road Race, Drag Race, Turbo and some in Blower.	820 & 836cc kits	B-17	Honda CB750 K up to '78	192.00 to 227.00
	890, 970, 1000, 1030 & 1055cc kits	B-17	Honda CB750 K up to '78	272.00 to 308.00
	810 & 823cc kits	B-18	Honda CB750 K & F '80	194.00 to 230.00
	848, 874, 900, 954, 981 & 1010cc kits	B-18	Honda CB750 K & F '80	275.00 to 308.00
	1063, 1096 & 1129cc kits	B-19	Honda CBX	292.00 to 342.00
	1163cc kit	B-19	Honda CBX	413.00 to 462.00
	694, 705 & 716cc kits		Kawasaki KZ650	192.00 to 227.00
	738, 761, 784 & 831cc kits		Kawasaki KZ650	272.00 to 308.00
	903, 930, 958, 1000 & 1015cc kits		Kawasaki KZ900 & KZ1000	192.00 to 227.00
	1045, 1075, 1105, 1135, 1166 & 1197cc kits		Kawasaki KZ900 & KZ1000	272.00 to 308.00
	1229, 1261, 1294, 1327 & 1411cc kits		Kawasaki KZ900 & KZ1000	276.00 to 312.00
Super piston kits for the serious racer complete with special cylinder block. 13.5:1 compression ratio.	1197, 1229, 1261, 1294, 1327cc kits		Kawasaki KZ900 & KZ1000	952.00
Blower piston kits complete with special 'O' ringed cylinder block.	1197, 1229, 1261, 1294 & 1327cc kits		Kawasaki KZ900 & KZ1000	834.00
	795, 819 & 868cc kits		Suzuki GS750 (8 valve)	192.00 to 227.00
	893 & 918cc kits		Suzuki GS750 (8 valve)	272.00 to 308.00

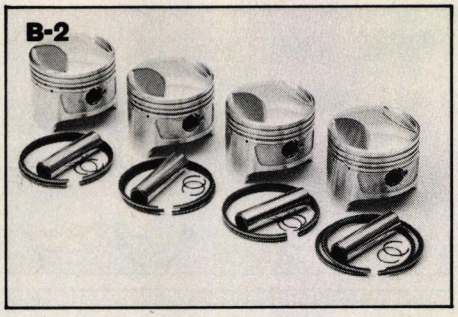
High-Performance Engine Kits

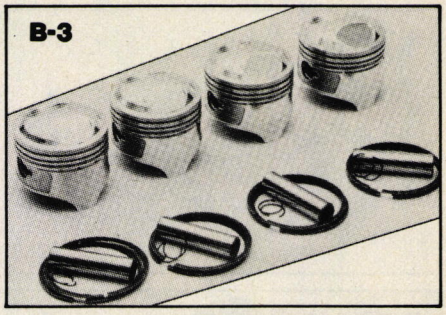
Big-Bore Kits

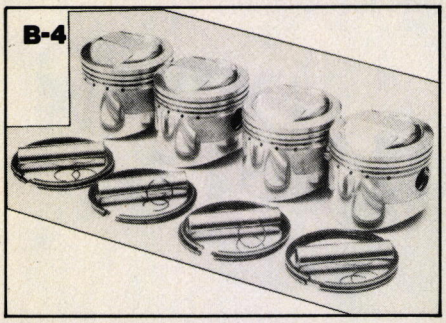
MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
M.T.C. Engineering (cont.)	769, 816 & 839cc kits		Suzuki GS750 (16 valve) '80	**$194.00 to 230.00**
	863 & 887cc kits		Suzuki GS750 (16 valve) '80	**275.00 to 308.00**
	1000, 1026 & 1055cc kits		Suzuki GS1000	**192.00 to 227.00**
	1084, 1114 & 1175cc kits		Suzuki GS1000	**272.00 to 308**
	1104 & 1134cc kits	B-20	Suzuki GS1100 (16 valve)	**194.00 to 230.00**
	1074, 1166, 1198 & 1230cc kits	B-20	Suzuki GS1100 (16 valve)	**275.00 to 308.00**
Super piston kits for the serious racer complete with special cylinder sleeves. 13.5:1 compression ratio.	1104 & 1134cc kits		Suzuki GS1100 (16 valve)	**308.00**
	1074, 1166, 1198 & 1230cc kits		Suzuki GS1100 (16 valve)	**383.00**
Blower piston kits complete with cylinder sleeves.	1104 & 1134cc kits		Suzuki GS1100	**229.00**
	1074, 1166, 1198 & 1230cc kits		Suzuki GS1100	**310.00**
	1117, 1148 & 1180cc kits		Yamaha XS1100	**192.00 to 227.00**
	1212 & 1244cc kits		Yamaha XS1100	**272.00 to 308.00**
Powroll Performance Products	305cc kit	B-21	Honda XL/XR250S	**105.00**
	836cc kit	B-22	Honda CB750	**NA**
Die cast alloy pistons specially engineered for each specific use.	90mm kit	B-23	Yamaha SR/XT/TT500	**65.00**
	750cc kit	B-24	Yamaha XS650	**130.00**
R.C. Engineering	836cc kit	B-25	Honda CB750	**254.50**
Forged alloy pistons designed specifically for each application. Most are available in 10.5:1 or 12.5:1 and some for turbos in 7.8:1 compression ratio.	836cc kit, cast pistons		Honda CB750	**159.95**
	900cc kit		Honda CB750	**349.00**
	970, 1000 & 1080cc kits		Honda CB750	**378.50**
	1170cc kit		Honda CBX	**476.75**
	717cc kit		Kawasaki KZ650	**249.00**
	1013cc kit, cast pistons		Kawasaki KZ900	**163.00**
	1013cc kit		Kawasaki KZ900	**286.00 to 300.60**
	1075cc kit		Kawasaki KZ1000	**286.00 to 300.60**
	1103, 1132, 1170 & 1200cc kits		Kawasaki KZ1000	**385.00 to 399.60**
	870cc kit		Suzuki GS750	**297.00**
	1015, 1055 & 1085cc kits		Suzuki GS1000	**297.00**
	1176cc kit		Suzuki GS1000	**402.30**
	1150 & 1220cc kits		Yamaha XS1100	**301.00**
Big Block and Pro Block cylinder assemblies sold with or without pistons, rings, wrist pins and buttons.	970cc and up	B-26	Honda CB750 and Kawasaki KZ900/1000	**523.95 to 937.50**
Sifton Motorcycle Products Specially designed barrels machined to suit any bore or stroke dimensions.	Big Bore Barrels made to your specifications of 2024-T4 or 7075-T6 aluminum alloy	B-27	Harley-Davidson	**N.A.**
Trock Cycle Specialties High-tensile ductile iron castings offer up to 3 7/16-inch bore.	Big Bore Barrels	B-28	Harley-Davidson Sportster	**660.00 inc. mach.**
High-tensile ductile iron castings offer up to 3 13/16-inch bore.	Big Bore Barrels from 90 to 114 cu. in.	B-29	Harley-Davidson 74	**405.00 + machining**
Wiseco Piston	811, 836 & 915cc kits	B-30	Honda CB750 K & F	**189.00**
Forged alloy pistons engineered specifically for each individual application.	700 & 720cc kits	B-31	Kawasaki KZ650	**189.00**
	1015 & 1045cc kits	B-32	Kawasaki KZ900/1000	**193.40**
	1075 & 1105cc kits	B-32	Kawasaki KZ900/1000	**193.40 to 281.40**
	1135cc kit	B-32	Kawasaki KZ900/1000	**294.60**
	610 & 630cc kits	B-33	Suzuki GS550	**189.00**
	844 & 870cc kits	B-34	Suzuki GS750	**193.40**
	1085 & 1100cc kits	B-35	Suzuki GS1000	**193.40**
	826 & 849cc kits	B-36	Yamaha XS750	**145.05**
Yoshimura Research & Development	458cc kit		Honda CB400	**180.00**
	466cc kit		Honda CB400	**185.00**
Permanent mold, high silicone, cast pistons. Some are available in either full-skirted or slipper-type.	553cc kit		Honda CB500	**185.00**
	562cc kit		Honda CB500	**189.95**
	590cc kit		Honda CB500	**195.00**
	810cc kit	B-37	Honda CB750	**185.00**
	823cc kit		Honda CB750	**189.95**
	716cc kit	B-38	Kawasaki KZ650	**230.00**
	987cc kit	B-39	Kawasaki KZ900	**215.00**
	1000cc kit		Kawasaki KZ900	**220.00**
	1015cc slipper kit		Kawasaki KZ1000	**235.00**
	1105cc kit		Kawasaki KZ1000	**240.00**
	450cc kit		Suzuki GS400	**120.00**
	610cc kit	B-41	Suzuki GS550	**210.00**
	850cc kit		Suzuki GS750	**220.00**
	1023cc slipper kit		Suzuki GS1000	**250.00**
	1100cc kit		Suzuki GS1000	**242.00**

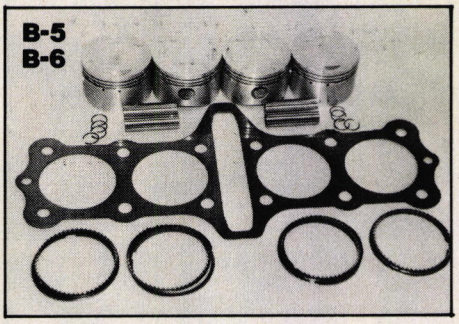
Big-Bore Kits

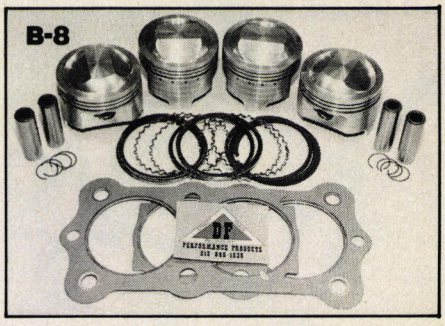


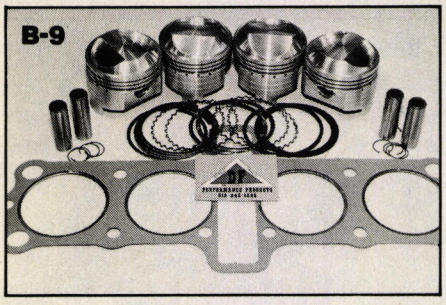


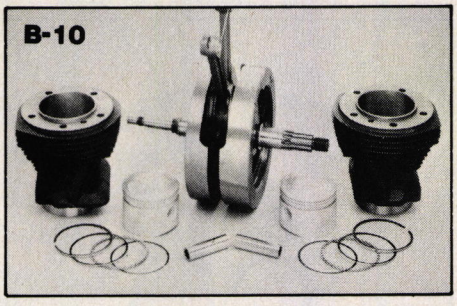


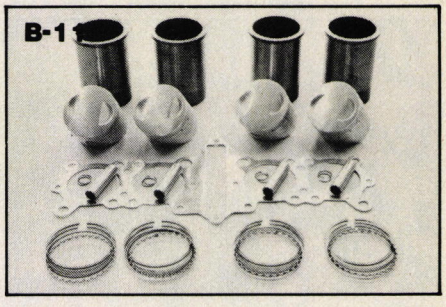


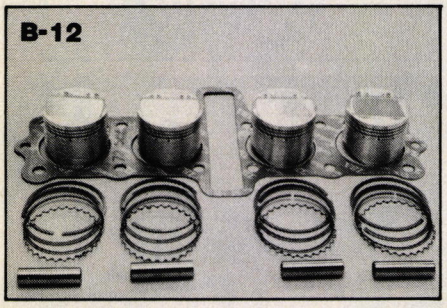


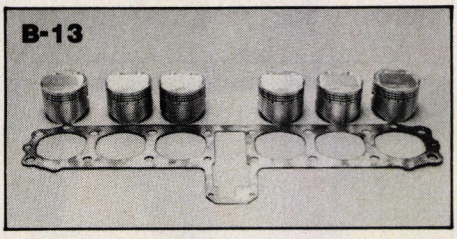


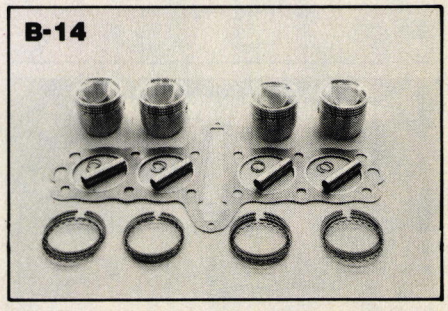


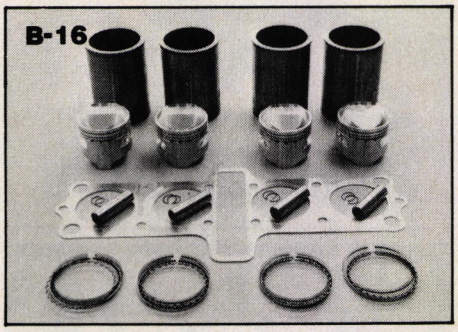


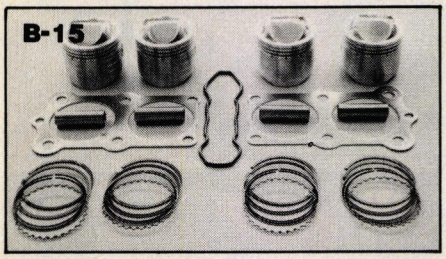


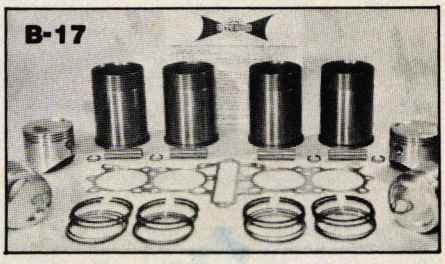


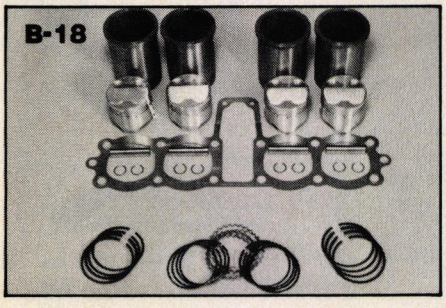


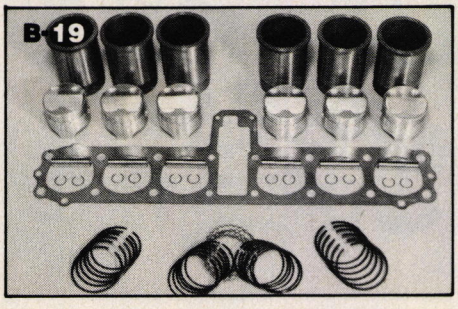


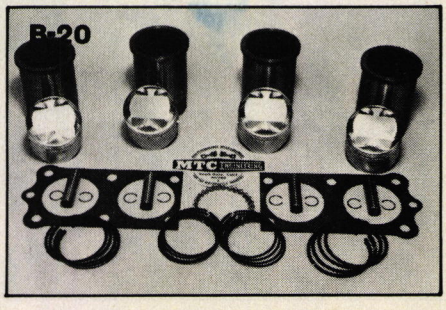




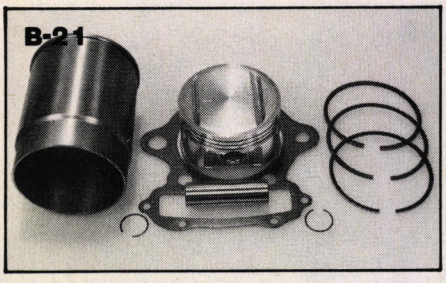


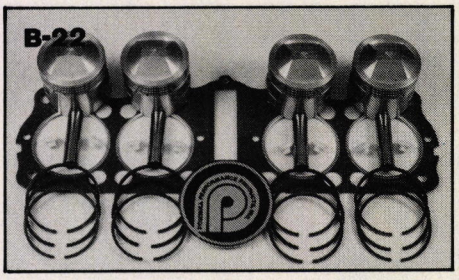


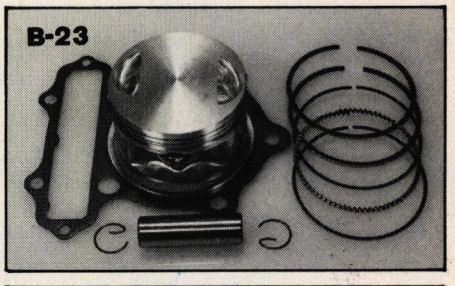


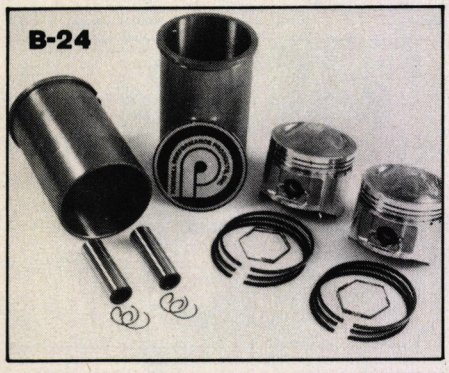


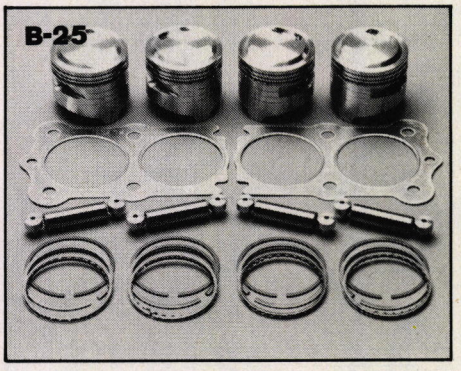
Big-Bore Kits

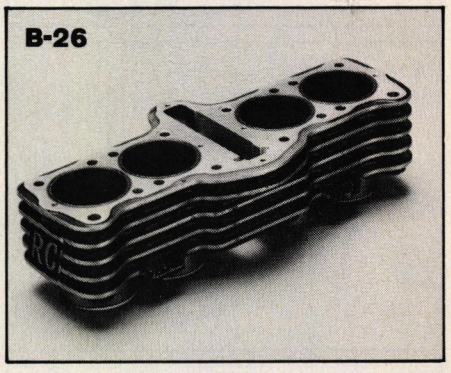


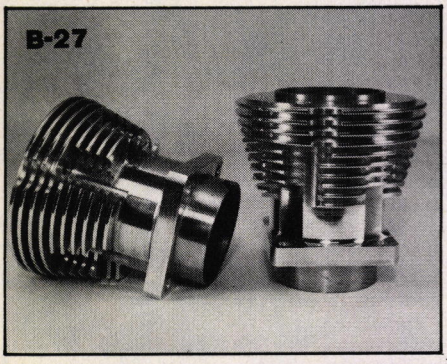


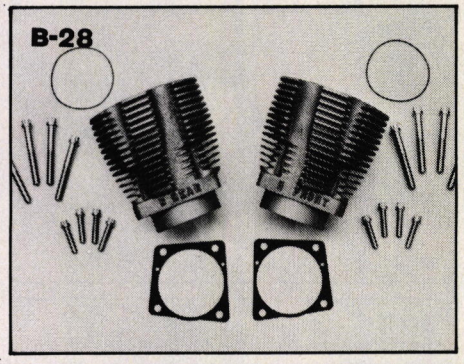


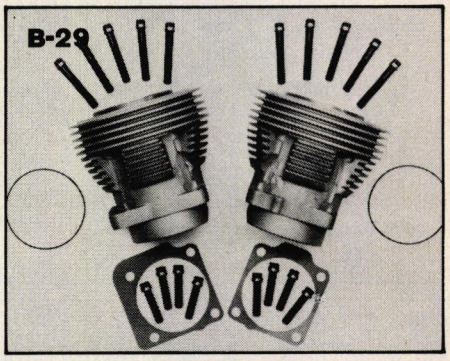


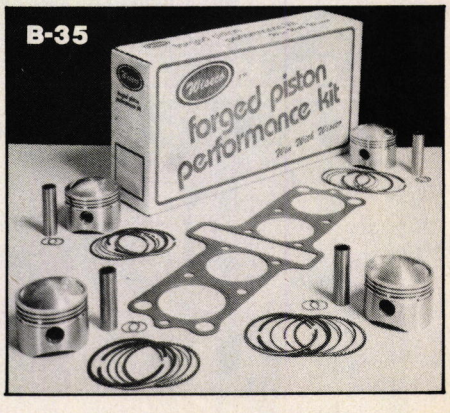






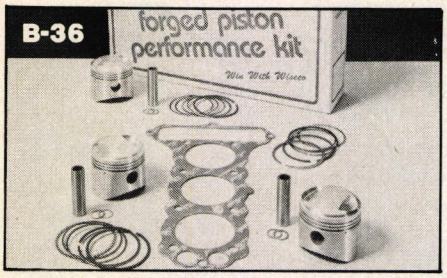


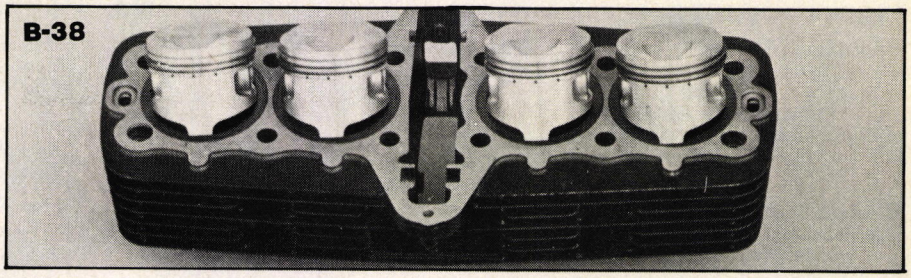


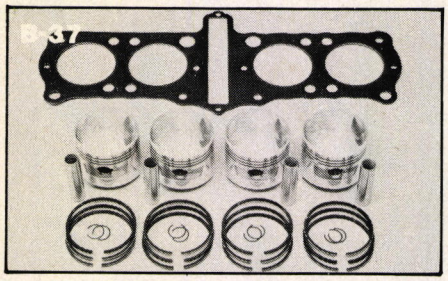


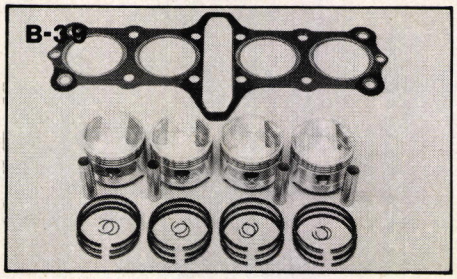
High-Performance Engine Kits

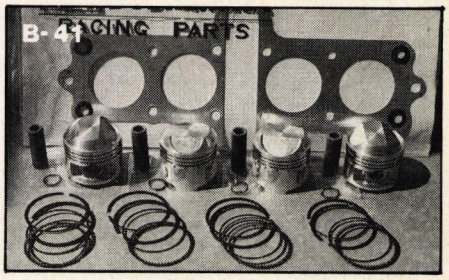
Big-Bore Kits





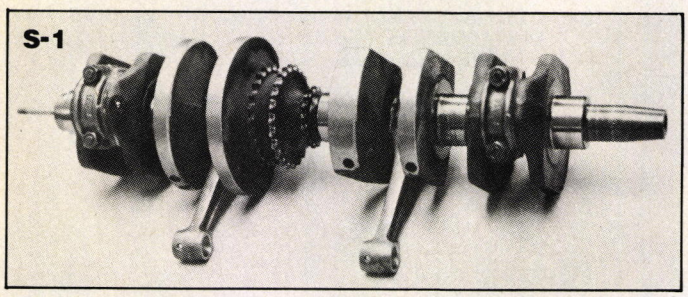


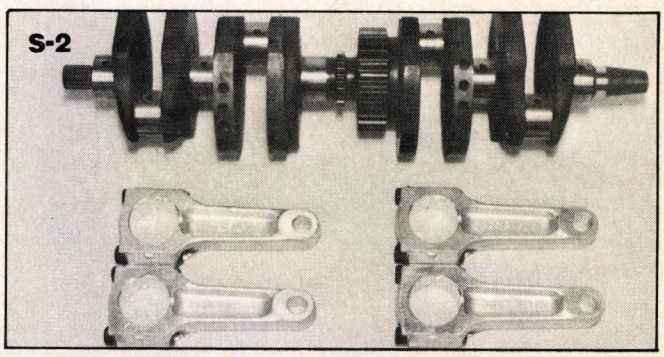


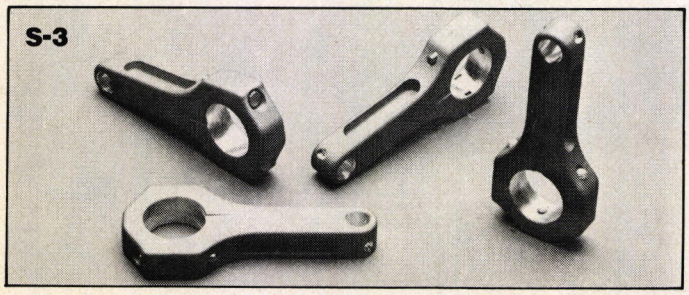


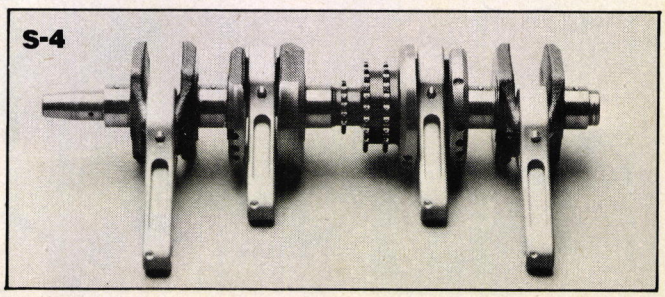
Stroker Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
M & M Racing M & M will stroke your crankshaft to any dimension on a one-off basis providing you can come up with the correct connecting rods.	Custom stroked crankshaft machining	S-1	Honda, Kawasaki KZ650 & Yamaha	**$350.00**
M.T.C. Engineering MTC offers a ¼-inch stroked Honda 750 crank with hard chromed and reground main bearing journals and your choice of forged alloy or forged steel connecting rods. Stroker piston kits also available.	¼-inch stroker crank, forged alloy rods	S-2	Honda CB750	**775.00**
	¼-inch stroker crank, forged steel rods		Honda CB750	**799.00**
	899, 970, 1000, 1030 & 1066cc stroker piston kits		Honda CB750	**321.00**
R.C. Engineering R.C. offers 100 percent alloy billet H-section Golden Rods with ¼-inch stroke designed in.	¼-Stroker Golden Rods	S-3	Honda CB750 '69–'78	**443.00**
Developed specifically for the Honda 750, this kit features a ¼-inch longer stroke crankshaft with special hard chrome alloy chrome alloy on the rod and main journals. Kits add approximately 100cc to stock motor.	750 Stroker Kit	S-4	Honda CB750 '69–'78	**1134.70 + core exchange**



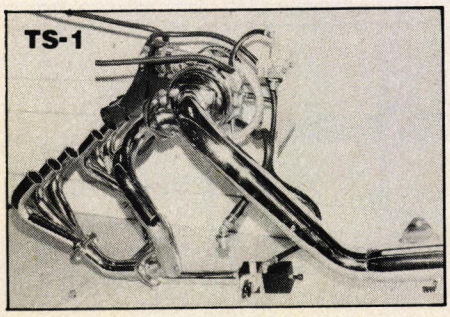


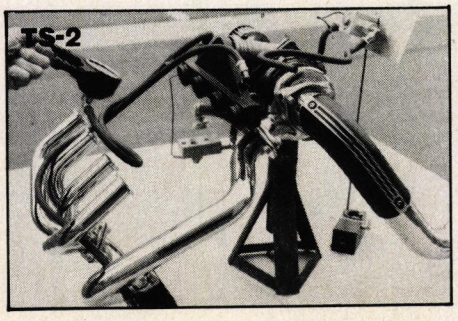


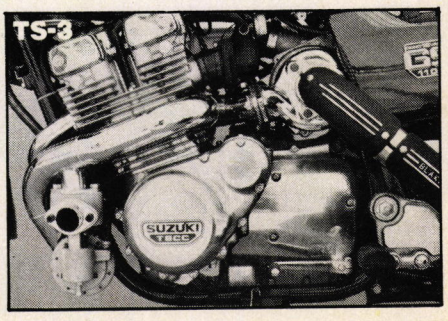


Turbo-Superchargers

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
American Turbo-Pak Complete turbocharger kits for most popular hyperbikes utilizing a specially modified turbo unit and years of development time. Some kits feature the efficient Japanese IHI turbo unit.	Turbo-Pak kits	TS-1 & TS-2	Honda CB750 (SOHC & DOHC), Honda CBX, Kawasaki KZ650, KZ900 (inc. LTD), KZ1000, Suzuki GS750, GS1000, BMW R100S & R100RS Harley-Davidson, Honda CBX & Goldwing, Suzuki GS1100	**$1595.00** **1795.00**
Blake Enterprises Bill Blake engineers and manufactures custom made turbo kits mating his components to Rajay turbochargers. Each kit is designed specifically for each customer's individual needs and intended usage (including street only applications) on a one-on-one basis. All kits include all necessary components and hardware necessary for installation. Water-alcohol injection systems are optional.	Custom designed turbo kits	TS-3	Most popular machines—street and racing	**1295.00 and up**
Competition Engineering D F turbochargers are available as complete kits in either a street or racing configuration. A unique feature is their remote dial-a-boost mechanism.	Turbocharger kits	TS-3	Honda CB750 (SOHC & DOHC), Honda CBX, Kawasaki KZ900 & KZ1000, Suzuki GS750, GS1000 & GS1100, Yamaha XS1100	**1295.00 to 1595.00**
Drouin Products Drouin superchargers for Kawasaki feature a Roots positive-displacement-type supercharger unit complete with specially designed adapters to make installation quick and easy for most riders.	Performance Pak Supercharger	TS-4	Kawasaki KZ900 & KZ1000 '73–'80	**1495.00**
M.T.C. Engineering Turbo kits tailored to meet your personal racing needs in three basic configurations. Kits soon to be available for most all four-cylinder hyperbikes.	Turbo-Kits	TS-5	Kawasaki KZ900 & KZ1000, Suzuki GS1000	**1300.00 to 1380.00**
Magnuson Products Complete bolt-on supercharger kits available in three different capacities to suit various engine sizes. Unit is driven by a #35 duplex chain off of the clutch.	Magnacharger supercharger	TS-6	Harley-Davidson & Honda	**1595.00 to 1725.00**
R.B. Racing Complete turbo kits with all of the pieces you'll need for a fast and simple installation. Turbocharger units receive special modifications to make them responsive at low rpm.	Turbocharger kits		Honda CB750 (SOHC & DOHC), Honda CBX, Kawasaki KZ900 & KZ1000, Suzuki GS750 & GS1000, Yamaha XS1100	**1295.00**
R.C. Engineering R.C.'s bolt-on turbo kits feature a specially designed manifold-sensing diaphragm wastegate and their own Power Master turbo carburetor.	Turbocharger kits	TS-8	Honda CB750, Kawasaki KZ900 & KZ1000, Suzuki GS750 & GS1000, Yamaha XA1100	**1495.00**
Rivera Engineering Rivera offers a complete bolt-on turbo kit which utilizes the efficient IHI turbocharger with integral diaphragm wastegate and the Eliminator SU carburetor.	Eliminator Turbo kit	TS-9	Harley-Davidson Sportster or Shovelhead	**1295.00**

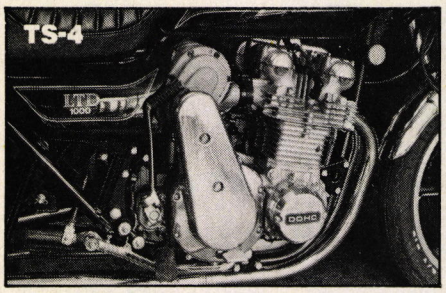


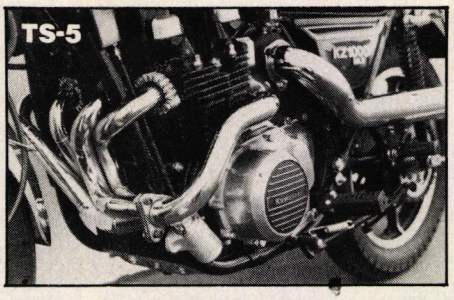


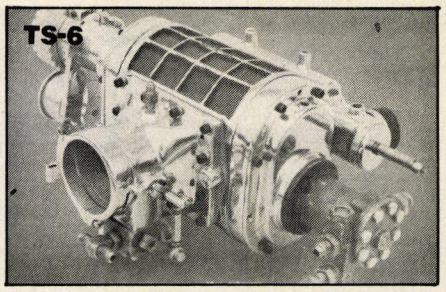


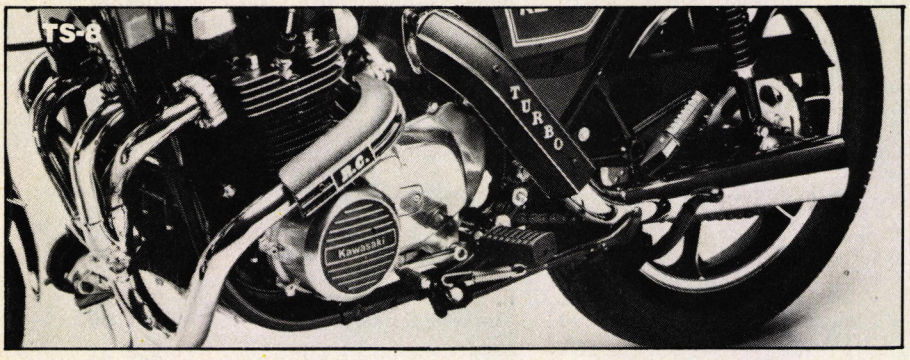
High-Performance Engine Kits

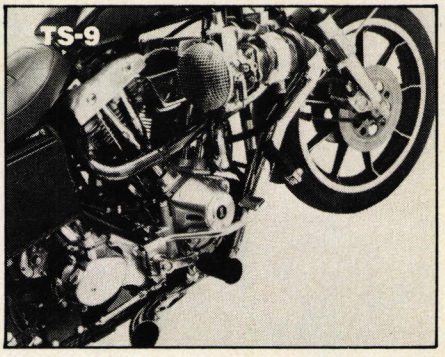
Turbo-Superchargers











Camshaft Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Action Fours Action Fours sells new, cast billet camshafts exclusively. Stock pistons cannot be used with any of their cams. They feel that optimum performance can be had only with the correct cam and piston combination.	'DS' street grind cam with racing valve springs	C-1 & C-2	Honda CB500 & CB550	**$237.95**
	'DE' racing grind cam with racing valve springs		Honda CB500 & CB550	**237.95**
	'SS-1' grind cam with racing valve springs		Honda CB750	**234.95**
	'SS-2A' grind cam with racing valve springs		Honda CB750	**234.95**
	'65D' grind cam with racing valve springs		Kawasaki KZ650	**249.95**
	'L-1' grind cam with racing valve springs		Kawasaki KZ650	**249.95**
Andrews Products Cast billet camshafts of Proferal iron in a variety of grinds for whatever level of performance you desire.	A, D, K & 4 grinds for street, strip and drags with dual spring valve spring kits	C-3	Honda CB750	**135.00**
	10, 20, 30 & 40 grinds with spring kits	C-4	Kawasaki KZ650	**200.50**
	1S, 2S, 3S, 4S & 5S grinds with spring kits	C-5	Suzuki GS750 & GS1000	**200.50**
C.M. Performance Products Specially designed camshafts for Kawasaki and Suzuki with high silicone content shot-peened and-heat treated dual (inner & outer) valve springs.	Several grinds for various levels of performance	C-6 & C-7	Kawasaki & Suzuki (DOHC)	**245.00**
M & M Racing High-performance camshafts specifically designed for each level of engine development. All prices include M & M's high silicone steel valve springs.	MM325 drop-in cam for stock motors		Honda CB750	**145.00**
	MM381 for 836 to 900cc motors	C-8	Honda CB750	**145.00**
	MM380 for 900 to 970cc motors		Honda CB750	**145.00**
	MM380D for 1000cc and up drag racing		Honda CB750	**145.00**
	MM320 turbo cam for street or strip		Honda CB750	**145.00**
	MM355 drop-in for stock motors	C-9	Kawasaki KZ650	**200.00**
	MM404 for modified engines		Kawasaki KZ650	**200.00**
	MM400 recommended for larger engines		Kawasaki KZ650	**200.00**
	MM357 no modifications necessary		Kawasaki KZ900 & KZ1000	**255.00**
	MM407 street and touring cam		Kawasaki KZ900 & KZ1000	**255.00**
	MM425 designed for larger engines		Kawasaki KZ900 & KZ1000	**255.00**
	MM440 recommended for fully modified engines		Kawasaki KZ900 & KZ1000	**255.00**
	MM460 full competition cam		Kawasaki KZ900 & KZ1000	**255.00**
	MM480 for 1200cc plus with full mods.		Kawasaki KZ900 & KZ1000	**255.00**
	MM485 call for recommended use		Kawasaki KZ900 & KZ1000	**255.00**
	MM357 drop-in with no modifications	C-10	Suzuki GS750/850 & GS1000	**255.00**
	MM404 hot street cam		Suzuki GS750/850 & GS1000	**255.00**

Camshaft Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
M & M Racing (cont.)	MM400 drag racing cam for large engines		Suzuki GS750/850 & GS1000	$255.00
	MM425 call for applications		Suzuki GS750/850 & GS1000	255.00
M.T.C. Engineering Computer designed billet, hardweld and reground cams developed from direct feed-back from their racing programs. All prices include racing valve springs by M.T.C.	MTC200 mild street race cam	C-11	Honda CB750 to '78	163.00
	MTC210 hot street race cam	C-11	Honda CB750 to '78	163.00
	MTC220 full competition cam	C-11	Honda CB750 to '78	163.00
	MTC230 all out race cam	C-11	Honda CB750 to '78	163.00
	MTC240 mild street race cam, hardfaced	C-12	Honda CB750 16 valve	394.00
	MTC250 hot street racer cam, hardfaced	C-12	Honda CB750 16 valve	394.00
	MTC280 Pro-Series Pro-Stock cam, hardfaced	C-12	Honda CB750 16 valve	394.00 + followers
	MTC260 mild street class, hardfaced		Honda CBX	520.00
	MTC270 hot street or road race, hardfaced		Honda CBX	520.00
	MTC280 Pro-Stock cam, hardfaced		Honda CBX	520.00
	MTC300 mild street racer, billet	C-13	Kawasaki KZ650	226.00
	MTC300 mild street racer, hardfaced	C-13	Kawasaki KZ650	276.00
	MTC No. 1 Pro-Series full race Pro-Stock	C-13	Kawasaki KZ650	252.00 to 292.00
	MTC 320 beginner cam	C-14	Kawasaki KZ900 & KZ1000	227.00
	MTC330 hot street class	C-14	Kawasaki KZ900 & KZ1000	227.00
	MTC340 special road race model	C-14	Kawasaki KZ900 & KZ1000	227.00
	MTC No. 1 very hot street class	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC No. 1 full race .435 lift Pro-Series	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC No. 2 full race .465 lift Pro-Series	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC No. 3 full race .480 lift Pro-Series	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC No. 4 full race .510 lift Pro-Series	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC360 blower cam .410 lift Pro-Series	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC370 blower cam .460 lift Pro-Series	C-14	Kawasaki KZ900 & KZ1000	252.00
	MTC400 mild street class		Suzuki GS750 & GS1000	227.00
	MTC410 hot street class		Suzuki GS750 & GS1000	227.00
	MTC No. 1 very hot street cam		Suzuki GS750 & GS1000	252.00
	MTC No. 1 Pro-Series full race .435 lift		Suzuki GS750 & GS1000	252.00
	MTC No. 2 Pro-Series full race .465 lift		Suzuki GS750 & GS1000	252.00
	MTC No. 3 Pro-Series full race .480 lift		Suzuki GS750 & GS1000	252.00
	MTC No. 4 Pro-Series full race .500 lift		Suzuki GS750 & GS1000	252.00
	MTC No. 5 Pro-Series blower cam .410 lift		Suzuki GS750 & GS1000	252.00
	MTC500 mild street class, hardfaced		Suzuki GS750 & GS1100 16 valve	421.00
	MTC510 hot street class, hardfaced		Suzuki GS750 & GS1100 16 valve	421.00
	MTC520 full race Pro-Series cam, hardfaced		Suzuki GS750 & GS1100 16 valve	447.00
	MTC530 full race Pro-Series cam, hardfaced		Suzuki GS750 & GS1100 16 valve	447.00
R.B. Racing New billet camshafts sold without exchange or core charge specially designed to improve street or strip performance. R.B. heavy-duty valve springs are included in the prices listed.	RB357 direct bolt-in performance	C-16A	Kawasaki & Suzuki	199.00 to 274.50
	RB408 for high-performance street use		Kawasaki & Suzuki	199.00 to 274.50
	RB410 endurance racing design		Kawasaki & Suzuki	199.00 to 274.50
	RB429 street/strip for 1132 or 1170cc		Kawasaki & Suzuki	199.00 to 274.50
	RB470/425 for drag racing only		Kawasaki & Suzuki	199.00 to 274.50
	RB470 competition design for drag racing		Kawasaki & Suzuki	199.00 to 274.50
	RB325 bolt-in performance booster	C-16B	Honda CB750	199.00
	RB357 for engines up to 836cc with mods.	C-16B	Honda CB750	199.00
	RB368 killer cam for large-bore drag racing	C-16B	Honda CB750	199.00
R.C. Engineering R.C. cams are designed from years of computer design, expert analysis on the dyno and through direct racing experience. Prices include R.C. valve spring kits.	RC240 torque cam, bolt-in performance	C-17	Honda CB750 '69–'78	126.95 (exchange)
	RC295 racer model, ideal for 900cc engines		Honda CB750 '69–'78	198.29 (exchange)
	RC315 hot racer model, for 900cc and larger		Honda CB750 '69–'78	198.29 (exchange)

Camshaft Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
R.C. Engineering (cont.)	RC327 full competition for 1000cc engines		Honda CB750 '69–'78	**$198.29 (exchange)**
	RC810 bolt-in regrind RCBX model		Honda CBX	**658.70 (exchange)**
	RC910 bolt-in special for street/road racing		Honda CB750 '79–'80	**498.05 (exchange)**
	RC405 bolt-in performance with no mods.		Kawasaki KZ650	**341.30**
	RC410 hot street competition model		Kawasaki KZ650	**341.30**
	RC415 Pro Stock model		Kawasaki KZ650	**341.30**
	RC420 for fuel and gas drag bikes		Kawasaki KZ650	**341.30**
	RC370 bolt-in performance with no mods.		Kawasaki KZ900 & KZ1000	**292.60**
	RC388 hot street competition model		Kawasaki KZ900 & KZ1000	**292.60**
	RC400 Pro Stock model		Kawasaki KZ900 & KZ1000	**292.60**
	RC470 for fuel and gas drag bikes		Kawasaki KZ900 & KZ1000	**292.60**
	RC500 racer special, bolt-in performance		Suzuki	**307.35**
	RC510 hot street competition model		Suzuki	**307.35**
	RC515 Pro Stock model		Suzuki	**307.35**
	RC520 fuel and gas drag bike cam		Suzuki	**307.35**
	RC700 bolt-in racer special		Yamaha XS1100	**364.80**
	RC710 hot street competition model		Yamaha XS1100	**364.80**
	RC715 Pro Stock model		Yamaha XS1100	**364.80**
	RC720 fuel and gas drag bikes		Yamaha XS1100	**364.80**
Rivera Engineering Rivera distributes Leineweber steel one-piece billet camshafts. Each grind was developed after years of research on the dyno and on the track. Prices listed include competition-style valve springs.	REL1 bolt-in for mild strokers		Harley-Davidson Sportster	**279.95**
	REL2 for 64 to 77 in. strokers		Harley-Davidson Sportster	**279.95**
	REL3 for up to 90 cu. in. strokers		Harley-Davidson Sportster	**279.95**
	REL4 street or strip, strokers to 90 cu. in.		Harley-Davidson Sportster	**279.95**
	REL6 for all racing large stroked engines		Harley-Davidson Sportster	**279.95**
	REJ1 bolt-in performance for stockers		Harley-Davidson 74	**184.95**
	REJ2 street or strip use		Harley-Davidson 74	**184.95**
	REJ3 for modified 74's and strokers		Harley-Davidson 74	**184.95**
	REJ4 street or strip, stock or stroker		Harley-Davidson 74	**184.95**
	REJ61 drag racing model, any size stroker		Harley-Davidson 74	**184.95**
Sifton Motorcycle Products Each Sifton cam is of the new billet variety and is Rockwell tested to insure exact hardness for improved strength and wear characteristics. Prices include Sifton heavy-duty valve spring kits.	201 Sportsman, bolt-in with no mods	C-20	Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	202 Hustler, for street or highway use		Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	203 Scorpion, street, drag and highway		Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	204 Stinger, high-performance model		Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	205 Titan, high-performance road and drag		Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	206 Boss, overall high-performance		Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	207 Barracuda, maximum performance model		Harley-Davidson Sportster (early or late)	**267.00 to 283.50**
	209 Big Mama, drag racing only	C-21	Harley-Davidson Sportster (early or late)	**300.00 to 324.75**
	210 Smoker, drag racing only		Harley-Davidson Sportster (early or late)	**300.00 to 324.75**
	211 Eliminator, street/strip high-performance		Harley-Davidson Sportster (early or late)	**300.00 to 324.75**
	212 Super Eliminator, for large racing engines		Harley-Davidson Sportster (early or late)	**300.00 to 324.75**
	101 Cruiser, bolt-in touring model		Harley-Davidson big twins '48 and later	**153.00 to 171.00**
	102 Aristocrat, bolt-in street cam		Harley-Davidson big twins '48 and later	**153.00 to 171.00**
	103 Side Kick, top-end power model	C-22	Harley-Davidson big twins	**153.00 to 171.00**
	109 Avenger, for new 80-inch engines		Harley-Davidson big twins	**153.00 to 171.00**
	107 Crusader, bolt-in low-to mid-range model		Harley-Davidson big twins	**153.00 to 171.00**
	110 Knucklehead, requires some mods.		Harley-Davidson big twins	**176.25**
	104 Silencer, designed for large motors		Harley-Davidson big twins	**153.00 to 171.00**
	105 Equalizer, requires some modifications	C-23	Harley-Davidson big twins	**153.00 to 171.00**
	106 Crusher, designed for engines over 90-in.		Harley-Davidson big twins	**153.00 to 171.00**
	108 Magnum, ultimate street/strip model		Harley-Davidson big twins	**153.00 to 171.00**
	111 Outlaw, streetable all-out drag performance		Harley-Davidson big twins	**176.25 to 194.25**

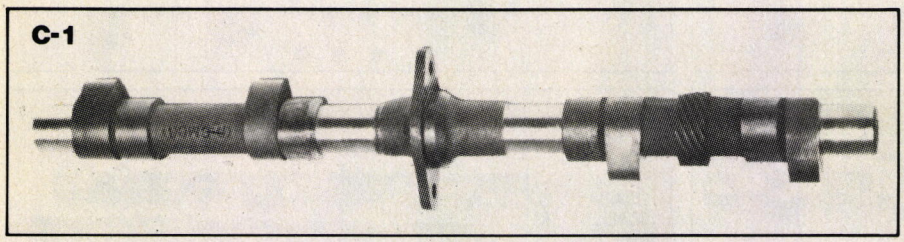
High-Performance Engine Kits

Camshaft Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Web-Cam Performance Camshafts Web-Cam offers performance profiles in regrinds, hardwelds and new billets with no core exchange necessary on new billet grinds. Their designs are backed by over 30 years of cam grinding experience. Prices include valve spring kits.	58A high-performance street hardweld		Honda 350/360 twin	**$129.95**
	58B hot street/cafe racer hardweld		Honda 350/360 twin	**129.95**
	58C Drag/road race hardweld		Honda 350/360 twin	**129.95**
	58A high performance street, regrind		Honda 500/550 4	**116.95 (regrind)**
	or billet		Honda 500/550 4	**176.95 (billet)**
	58B hot street/cafe racer, regrind		Honda 500/550 4	**116.95**
	or billet		Honda 500/550 4	**176.95**
	58C drag/road race regrind	C-24	Honda 500/550 4	**116.95**
	or billet		Honda 500/550 4	**176.95**
	41 street/touring bolt-in regrind		Honda CB750 (SOHC) to '78	**116.95**
	or billet		Honda CB750 (SOHC) to '78	**176.95**
	41A high-performance street regrind		Honda CB750 (SOHC) to '78	**116.95**
	or billet		Honda CB750 (SOHC) to '78	**176.95**
	63A hot street, requires mods., regrind		Honda CB750 (SOHC) to '78	**116.95**
	or billet		Honda CB750 (SOHC) to '78	**176.95**
	63B strong street/strip, regrind		Honda CB750 (SOHC) to '78	**116.95**
	or billet		Honda CB750 (SOHC) to '78	**176.95**
	63C for competition engines, regrind		Honda CB750 (SOHC) to '78	**116.95**
	or billet		Honda CB750 (SOHC) to '78	**176.95**
	91 improved street/touring regrind		Honda GL1000	**161.95**
	91A H.P. street, stock or mod., regrind		Honda GL1000	**161.95**
	91B for hot street engines, regrind		Honda GL1000	**161.95**
	40B high-performance street hardweld		Kawasaki KZ400	**129.95**
	40C hot street/cafe racer hardweld		Kawasaki KZ400	**129.95**
	86 stock street or touring use, hardweld		Kawasaki KZ650	**241.95**
	118 hot street use with mods, hardweld		Kawasaki KZ650	**241.95**
	110 for street/strip modified engines, hardweld		Kawasaki KZ650	**241.95**
	109 drag/road race compeittion, hardweld		Kawasaki KZ650	**241.95**
	118 H.P. street, stock or mod., hardweld		Kawasaki KZ900 & KZ1000	**241.95**
	or billet		Kawasaki KZ900 & KZ1000	**271.95**
	110 for big bore street use, hardweld		Kawasaki KZ900 & KZ1000	**241.95**
	or billet		Kawasaki KZ900 & KZ1000	**271.95**
	109 drag/hot street use, hardweld or		Kawasaki KZ900 & KZ1000	**241.95**
	or billet		Kawasaki KZ900 & KZ1000	**271.95**
	86B hot street for mod. engines, hardweld		Kawasaki KZ900 & KZ1000	**241.95**
	or billet		Kawasaki KZ900 & KZ1000	**271.95**
	86C road racing competition, hardweld		Kawasaki KZ900 & KZ100	**241.95**
	or billet		Kawasaki KZ900 & KZ100	**271.95**
	86C5 strictly for racing engines, hardweld		Kawasaki KZ900 & KZ1000	**241.95**
	or billet		Kawasaki KZ900 & KZ100	**271.95**
	40A for stock or modified engines, regrind		Suzuki SP370	**49.95**
	or hardweld		Suzuki SP370	**79.95**
	40B for big bore modified engines, regrind		Suzuki SP370	**49.95**
	or hardweld		Suzuki SP370	**79.95**
	86 bolt-in street performance, hardweld		Suzuki GS550	**253.95**
	118 hot street cam for modified engines, hardweld		Suzuki GS550	**253.95**
	110 strong runner for competition, hardweld		Suzuki GS550	**253.95**
	118 drop-in stock street performance, hardweld		Suzuki GS750, 850, 1000	**255.95**
	or billet		Suzuki GS750, 850, 1000	**285.95**
	110 hot street/strip grind in hardweld		Suzuki GS750, 850, 1000	**255.95**
	or billet		Suzuki GS750, 850, 1000	**285.95**
	109 for drag strip or road racing, hardweld		Suzuki GS750, 850, 1000	**255.95**
	or billet		Suzuki GS750, 850, 1000	**285.95**
	89 bolt-in for stock engines, regrind		Yamaha XT & SR500	**56.95**
	or hardweld		Yamaha XT & SR500	**86.95**
	89A all around for stock or modified, regrind		Yamaha XT & SR500	**56.95**
	or hardweld		Yamaha XT & SR500	**86.95**
	88 designed for well built engines, hardweld		Yamaha XT & SR500	**86.95**

Camshaft Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Web-Cam Performance Camshafts (cont.)	88A for fully modified racing engines, hardweld		Yamaha XT & SR500	**86.95**
	59 designed for street/touring, regrind		Yamaha XS650	**89.95**
	59A high-performance street, regrind		Yamaha XS650	**89.95**
	59B hot street/cafe race grind, regrind		Yamaha XS650	**89.95**
	84 designed for TT and flat track, hardweld		Yamaha XS650	**129.95**
	84A flat track and road race special, hardweld		Yamaha XS650	**129.95**
	118 bolt-in for stock or modified, hardweld		Yamaha XS750 & XS1100	**238.95 or 255.95**
	86B for well built street/strip use, hardweld		Yamaha XS750 & XS1100	**238.95 to 255.95**
	86C top-end power for competition engines hardweld		Yamaha XS750 & XS1100	**238.95 to 255.95**
	110 designed for hot street engines, hardweld		Yamaha XS750 & XS1100	**238.95 to 255.95**
Yoshimura Research & Development Yoshimura's cams are designed from extensive dyno and racetrack time. None of their cams are designed to be used with stock pistons. Piston and valve spring kits are recommended for use with every camshaft.	131-01 special road design	C-25 &C-26	Honda CB400	**215.00**
	121-00 street special camshaft		Honda CB500	**227.95**
	122-00 TT special model		Honda CB500	**232.95**
	111-00 road special design		Honda CB750	**234.95**
	112-00 Daytona special camshaft		Honda CB750	**239.95**
	YZ65-101 stage 1 racing camshaft		Kawasaki KZ650	**309.95**
	101-01 road special camshaft set		Kawasaki KZ900 & KZ1000	**279.95**
	102-01 Bonneville Special design		Kawasaki KZ900 & KZ1000	**299.95**
	SU-111 stage 1 camshaft set		Suzuki GS750	**297.95**
	SU-102 stage II camshaft set		Suzuki GS750	**307.95**
	SU-101 stage I camshaft set		Suzuki GS1000	**297.95**
	SU-102 stage II camshaft set		Suzuki GS1000	**312.95**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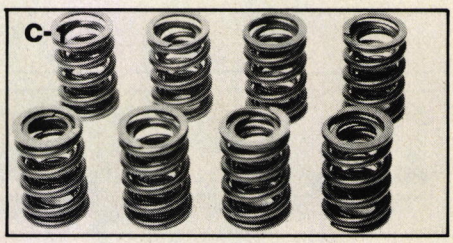
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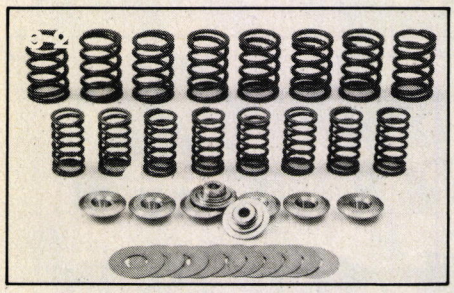

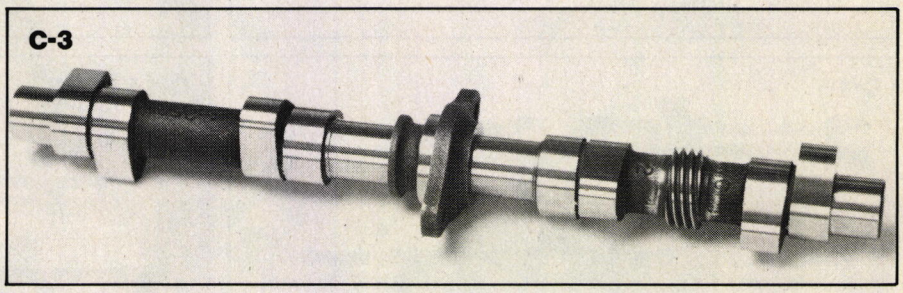
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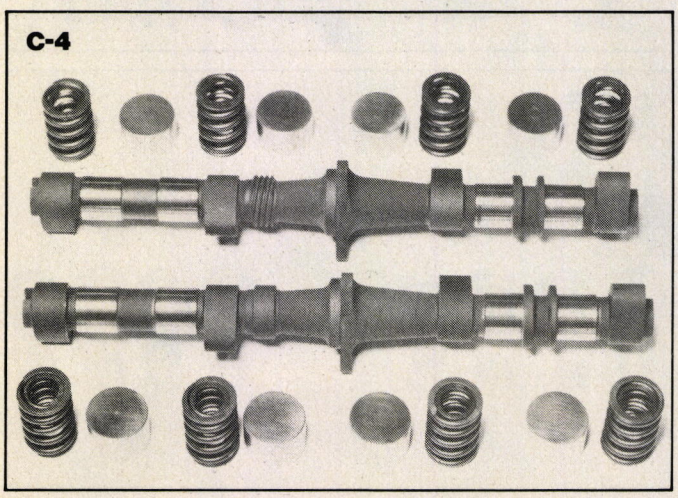
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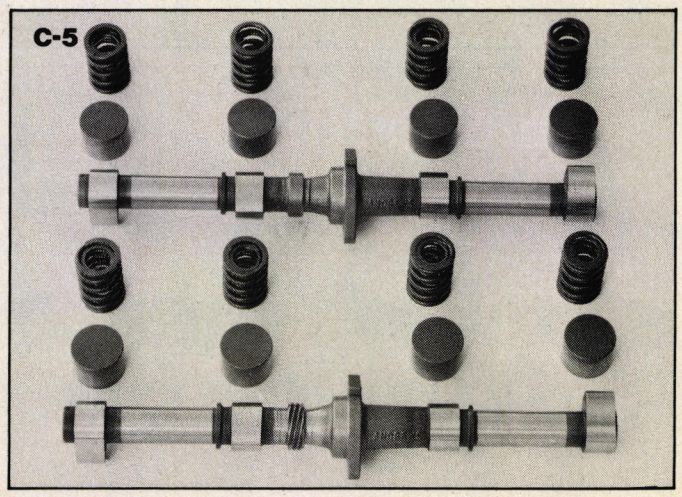
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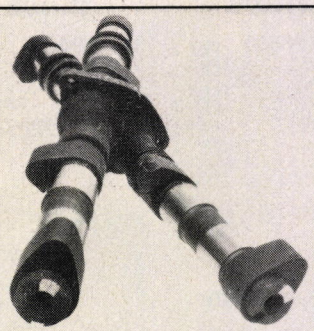
Camshaft Kits

C-6



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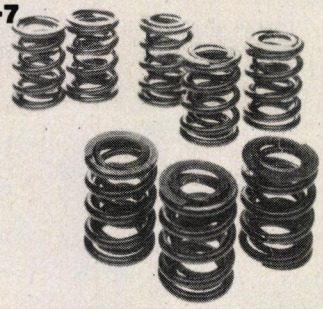

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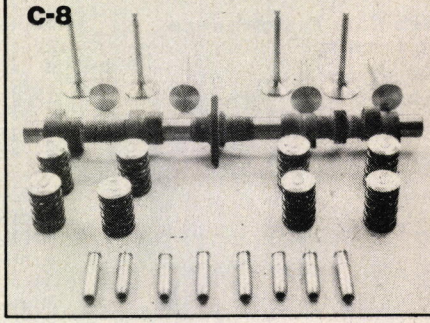

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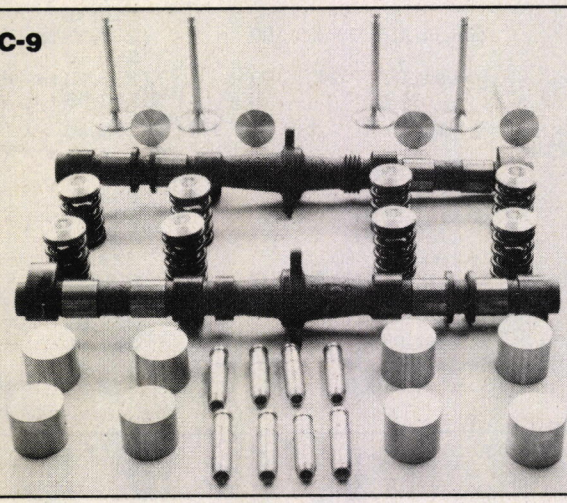

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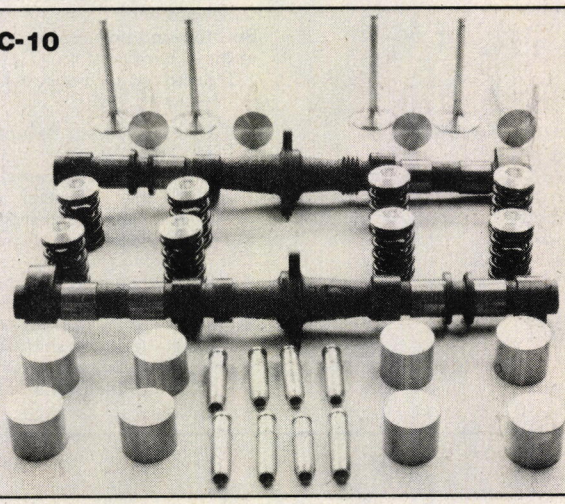

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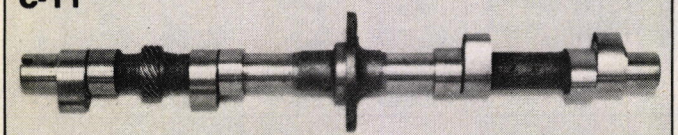

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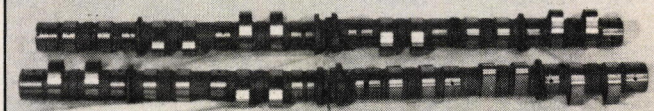

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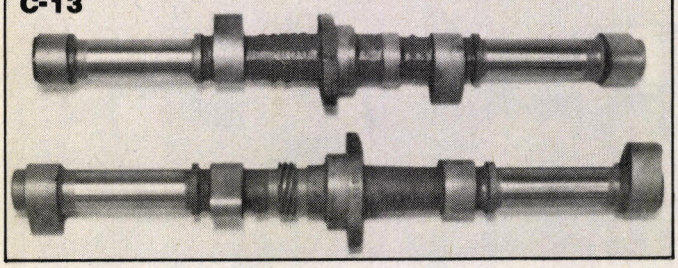

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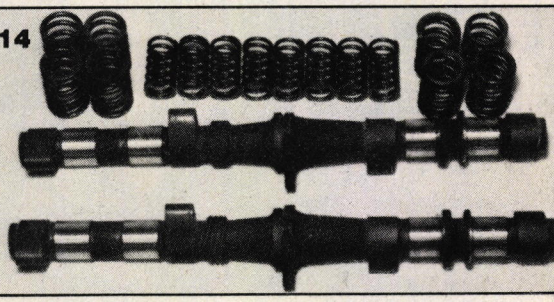

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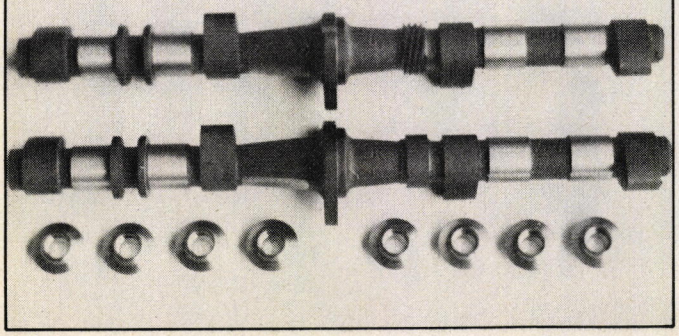

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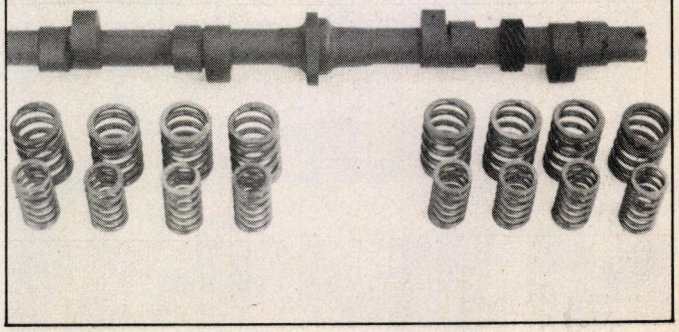
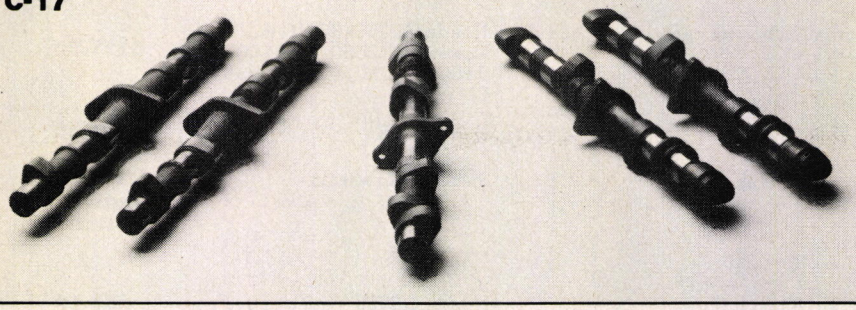


Camshaft Kits

C-17



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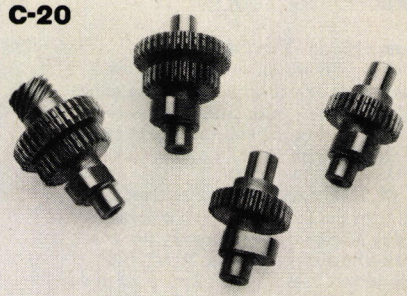

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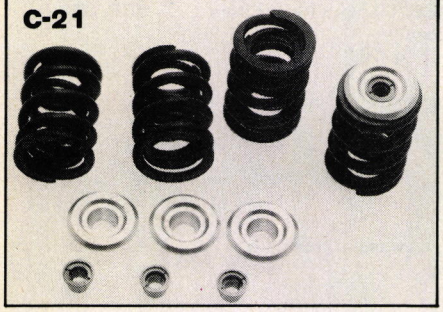

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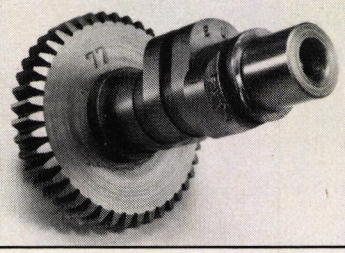

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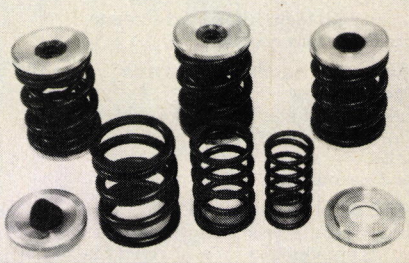

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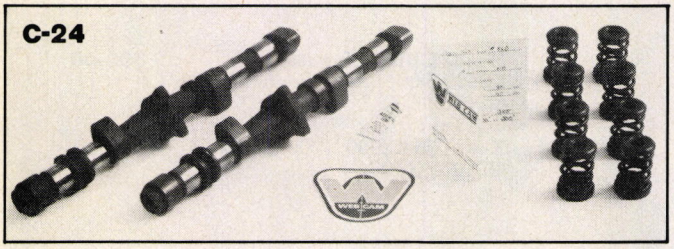

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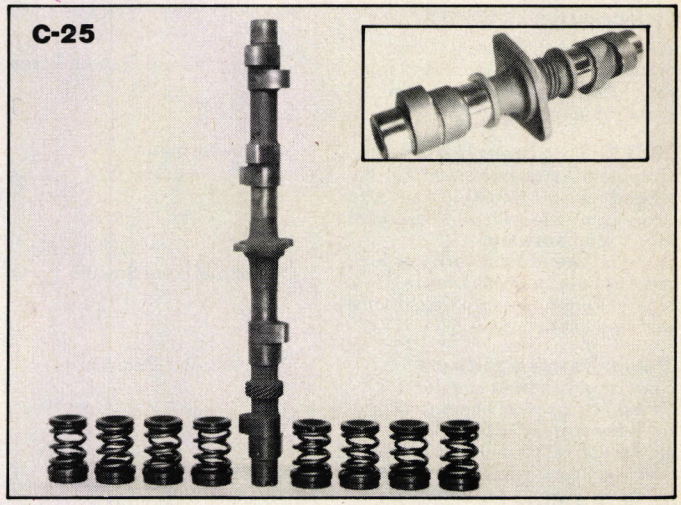

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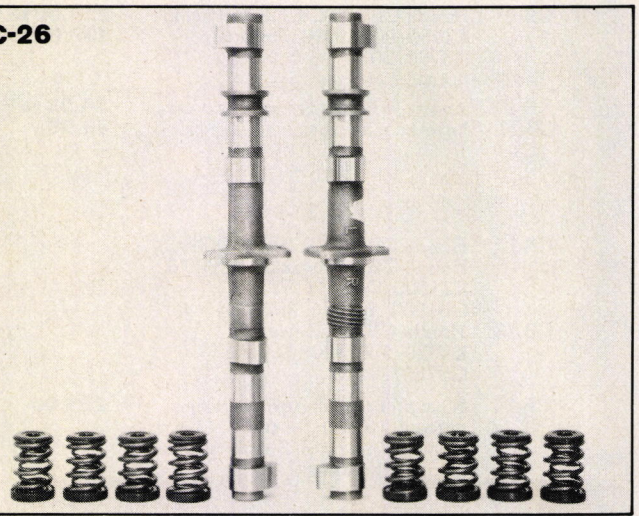

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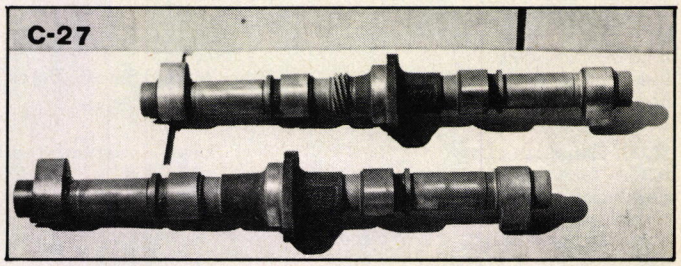


Carb Kits

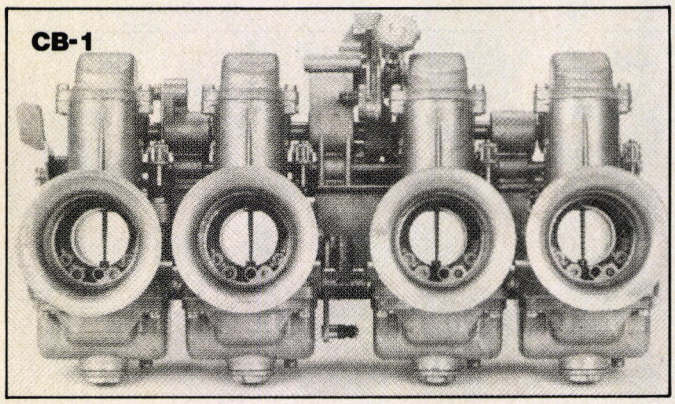
MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Action Fours Bolt-on Mikuni Smooth Bores for standard or special adaptation to most any machine. Carbs come equipped with short velocity stacks or can be supplied with K&N individual or dual oval filters. Price includes four adapters, air filters and carbs.	29mm Mikuni Smooth Bores	CB-1	Honda CB750 '69–'78, Kawasaki KZ650/900/1000, Suzuki GS750/850/1000	**$399.95**

Carb Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
American Turbo-Pak A specially modified Bendix 38mm carb with externally adjustable main jet and accelerator pump for ease of tuning and improved throttle response. Included with all ATP turbo-paks.	38mm Bendix Turbo-Pak carb	CB-2	Honda CB750 (SOHC & DOHC), Kawasaki KZ650/900/1000, Suzuki GS750/1000, Yamaha & BMW	**$175.00**
			Honda CBX	**275.00**
C M Performance Products Mikuni Smooth Bore carb kits fit many stock airboxes or may be used with aftermarket filters. Available pre-jetted to suit your particular needs.	29mm Mikuni Smooth Bores	CB-3	Suzuki & Kawasaki	**315.00 + adapters & filters**
Competition Engineering Complete Mikuni Smooth Bore carb kits available with either specially stepped open velocity stacks or stacks with foam filters and screens. Prices include adapters.	29mm Mikuni Smooth Bores		Honda CB750 (with stepped open stacks)	**328.10**
			Honda CB750 (with foam filters and screens)	**358.10**
Mike Burke Performance Specialties Unique dual manifold kits enable adaptation of two Mikuni, Amal or DellOrto carbs instead of four standard carburetors.	2 into 4 dual carb manifolds	CB-5	Honda CB750	**59.95**
M & M Racing Amal carburetor kits suggested for larger bore motors for a claimed improved mid-range and top end performance.	34mm EI, 100 + cfm carb kits		Honda, Kawasaki, Suzuki & Yamaha	**400.00**
Mikuni Smooth Bore carb kits claimed to provide increased mid-range throttle response and improved fuel economy.	29mm Mikuni Smooth Bores		Honda CB750, Kawasaki KZ650/900/1000, Suzuki GS750/1000	**300.00**
M.T.C. Engineering Complete Amal carburetor kits designed for a single cable pull. Kits come complete with all necessary mounting hardware. Smooth Bore Mikuni carb kits for most popular hyperbikes are designed to improve throttle response and fuel economy.	Amal carb kits	CB-8	Kawasaki KZ900/1000, Suzuki GS1000/1100	
	29mm Mikuni Smooth Bores	CB-9	Honda CB750 K & F2, Kawasaki KZ650/900/1000, Suzuki GS750/1000	**324.00 to 337.00**
Powerhouse Products Specially designed accelerator pump kits for most every motorcycle carburetor from 125 to 1300cc. Pump delivers a metered amount of fuel each time you open the throttle.	Accelerator Pump kits	CB-10 CB-11	single, twin, triple and quad carbureted machines	**34.95 to 49.95**
R. B. Racing A complete SU Eliminator turbo carb kit including carb, adapters, manifold and air filter.	S U Eliminator turbo carb kit	CB-12	Honda CB750 (SOHC & DOHC), Honda CBX, Kawasaki KZ900 & KZ1000, Suzuki GS750 & GS1000, Yamaha XS1100	
Mikuni Smooth Bore kits with all necessary mounting hardware and adapters included.	29mm Mikuni Smooth Bores	CB-13	Honda CB750, Kawasaki KZ650/900/1000,Suzuki GS750/1000	
R. C. Engineering R. C.'s Turbo carb was designed and developed by R. C. for use on their turbo kits. It features a fully adjustable fuel pump and cold start circuit, and an exclusive Power Jet that automatically compensates for boost.	R. C. Power Master turbo carb	CB-14	Most all turbocharging systems currently available and R. C.'s Honda, Kawasaki, Suzuki and Yamaha turbo units	**229.00**
R.C. Smooth Bore Mikuni carb kits complete with manifold adapters and jetting instructions.	29mm Mikuni Smooth Bores	CB-16	To fit most popular four cylinder machines.	**359.40**
Rivera Engineering Rivera manufacturers and distributes an extensive line of carburetor adapter kits for both the SU and DellOrto carbs. Kits are based on a wide variety of Rivera designed intake manifolds. Everything needed for bolt-on installations is included in their kits. Prices include either DellOrto or SU carburetors.	Dual 40mm DellOrto carb kit	CB-17	Honda CB750 '69 on	**399.00**
	Dual 40mm DellOrto carb kit	CB-18	Kawasaki KZ900 & KZ1000	**399.00**
	RE-600 single 40mm DellOrto kit	CB-19	Harley-Davidson Sportster, Panhead & Shovelhead	**229.95**
	SU Eliminator turbo carb kits	CB-20	Harley-Davidson Sportster, Panhead & Shovelhead	**219.00 to 299.95**
		CB-21		

Carb Kits

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Sudco International Sudco carries what is perhaps the largest selection of Mikuni carburetors available anywhere. Their newest item is the Mikuni Power Jet carb and conversion kit—a sort of intake air velocity powered fuel injection.	30, 32, 34, 36, 38 & 40mm Mikuni Power Jet	CB-22	Virtually any motorcycle	**$68.00 to 88.00**
	Mikuni Power Jet conversion kits	CB-23	All Mikuni carburetors	**18.00**
	Dual 29mm Mikuni Smooth Bores	CB-24	Harley-Davidson Sportster & Shovelhead	**260.00**
	Dual 29mm Mikuni Smooth Bores		Harley-Davidson Knucklehead & Panhead	**280.00**
	29mm Mikuni Smooth Bores with Accelerator Pump	CB-25	Honda CB750, Suzuki GS750/1000/1100 Kawasaki KZ650/900/1000, Yamaha XS1100	**406.50**
	29mm Mikuni Smooth Bores		Honda CB750, Suzuki GS750/1000/1100, Kawasaki KZ650/900/1000, Yamaha XS1100	**346.50**
Yoshimura Racing & Development Yoshimura offers both the popular Mikuni Smooth Bore kits as well as Keihin CR 31mm racing carburetors. All kits come complete and ready to bolt on to your engine.	29mm Mikuni Smooth Bores	CB-26	Suzuki GS750/1000/1100, Kawasaki KZ650/900/1000	**333.00**
	31mm Keihin CR racing carburetors		Large capacity four-cylinder machines	**575.00**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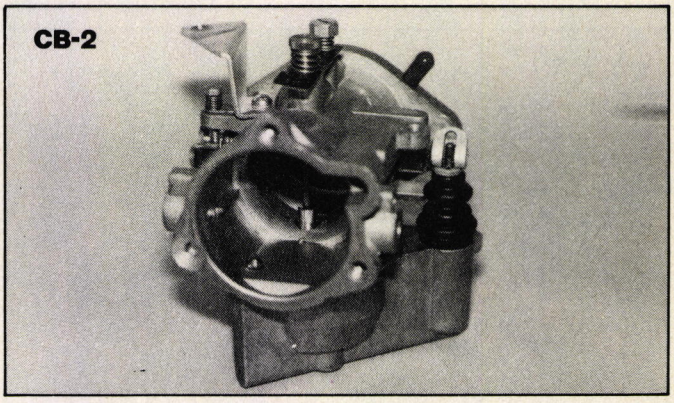
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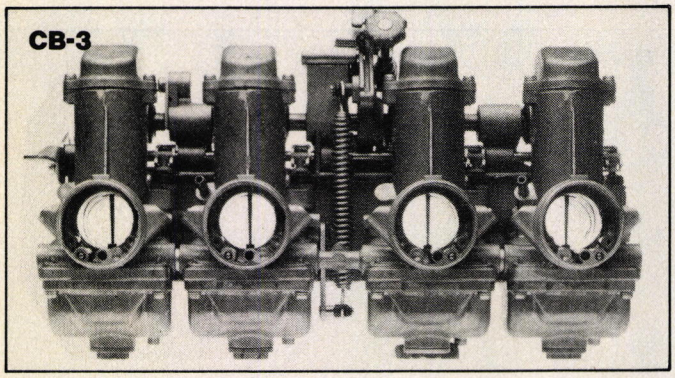
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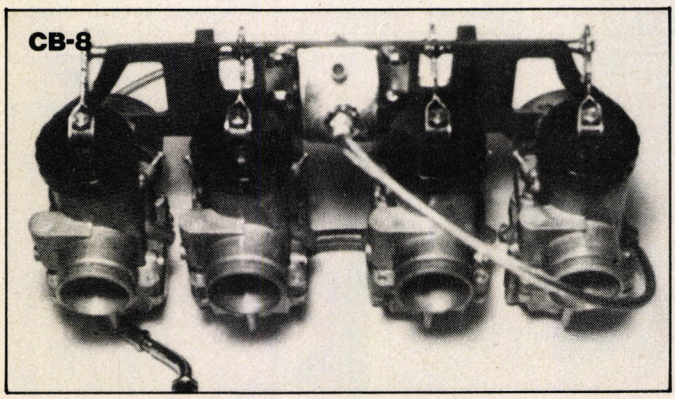
CB-5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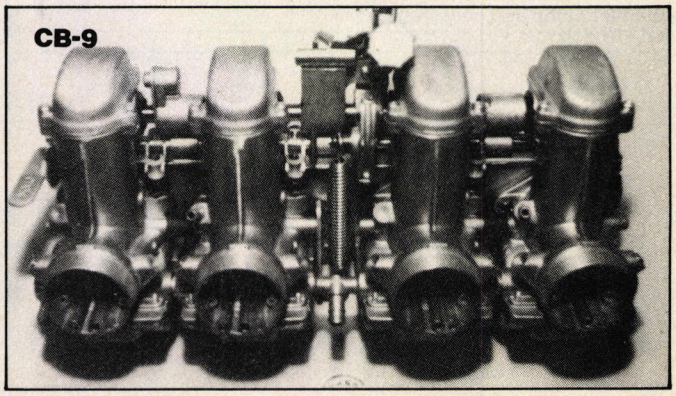
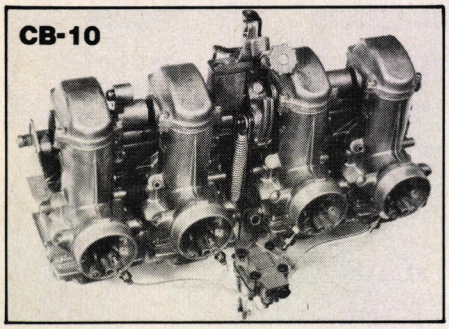

CB-9

Carb Kits

CB-10



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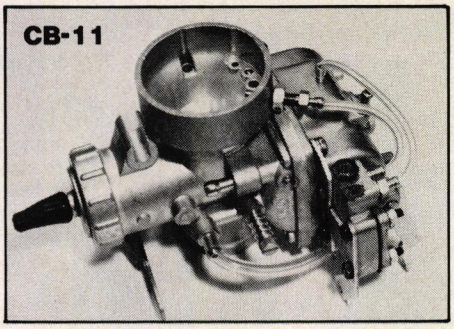

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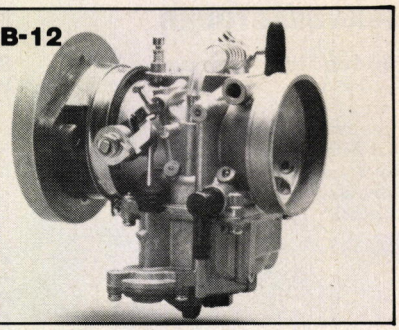

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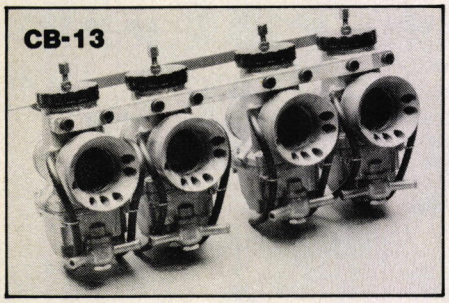

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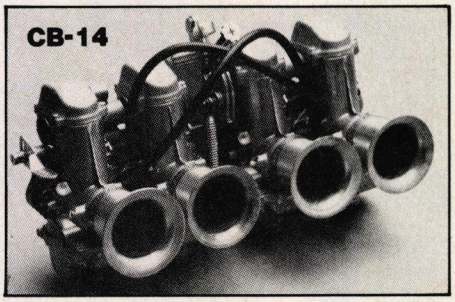

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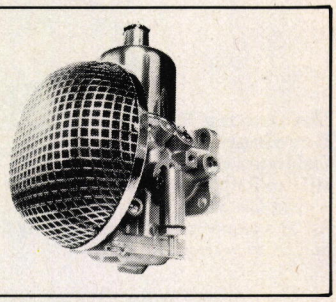

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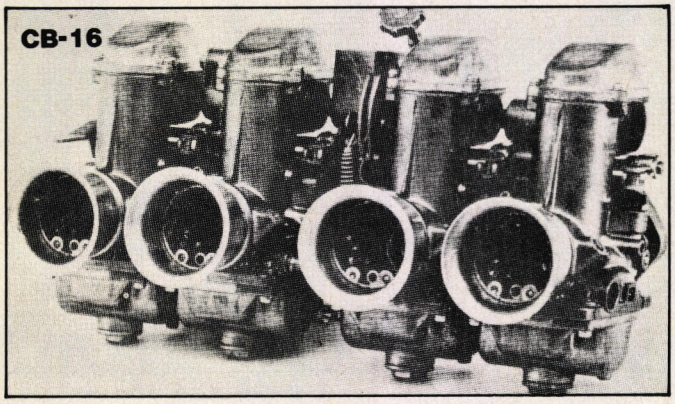

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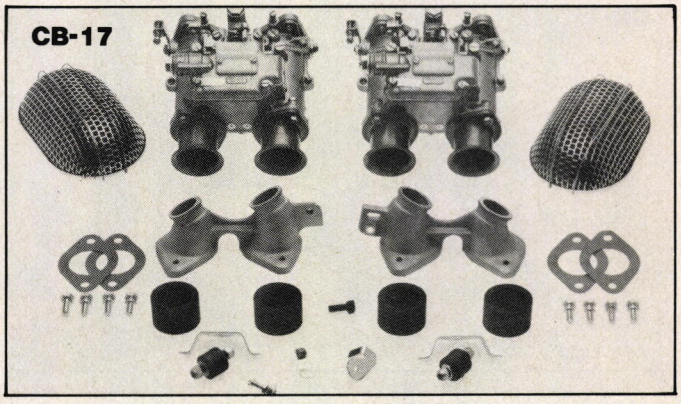

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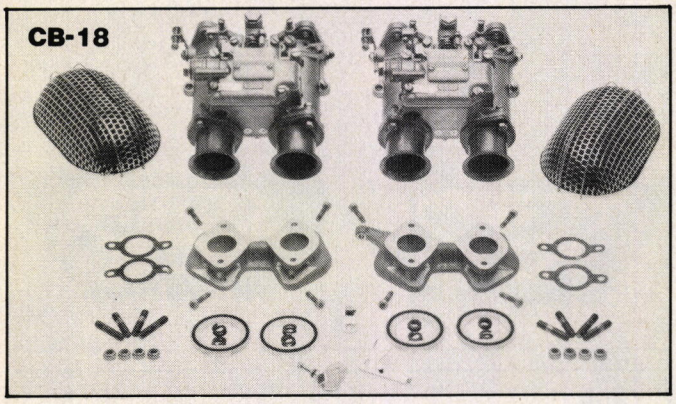

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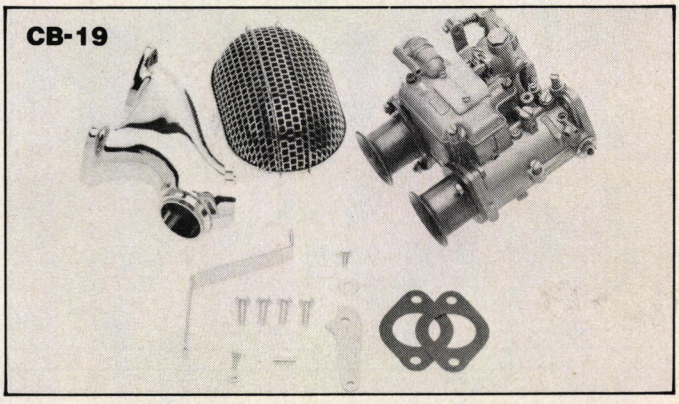

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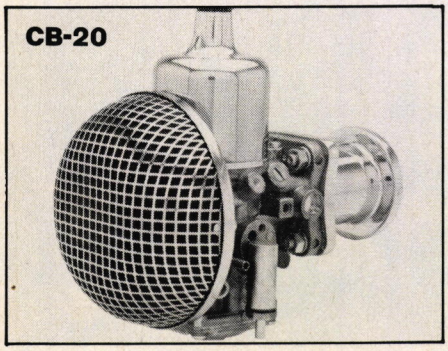

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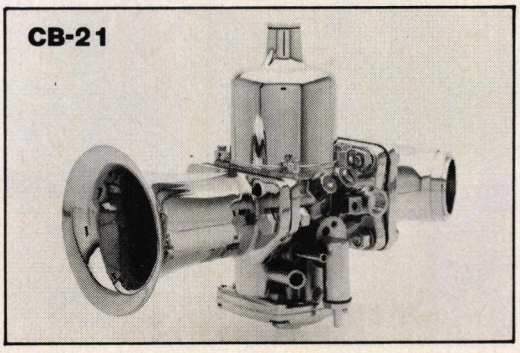

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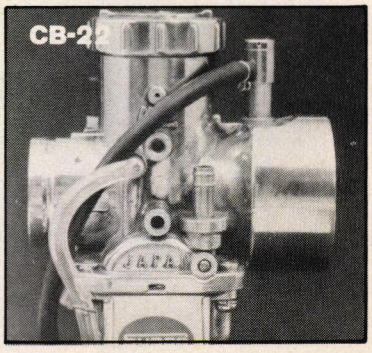
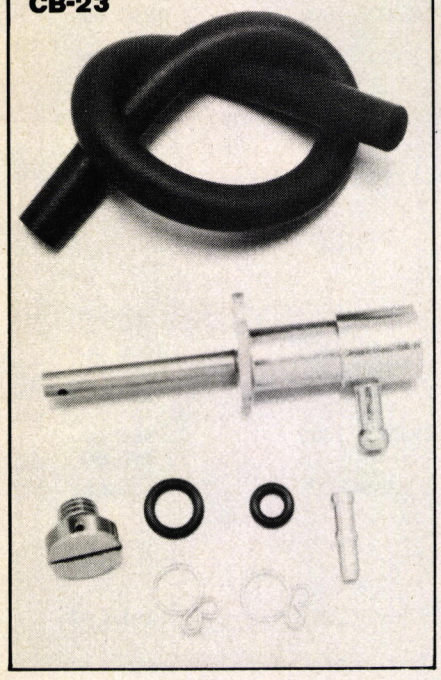


Carb Kits

CB-23



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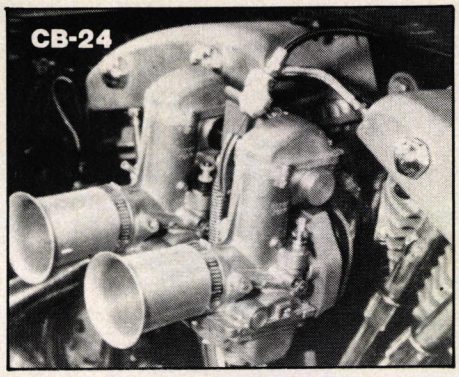

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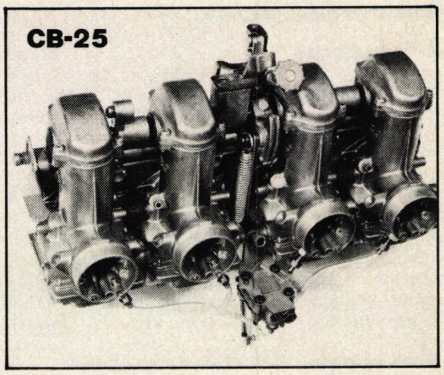
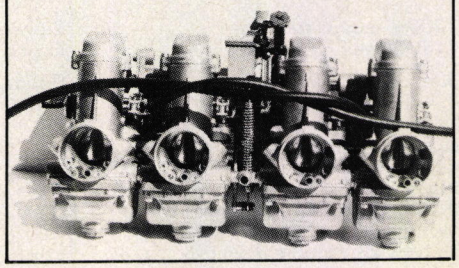


CB-26 ヨシムラ YOSHIMURA



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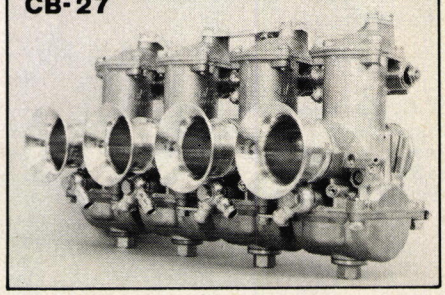

Engine packages

MANUFACTURER

Action Fours
Proven and recommended combinations of their products in the form of Stage I, II & III packages. Stage I was designed to maintain smooth and tractable performance with a substantial power increase. Stage II represents hotter combinations for those who want the most from their "streetable" machines and plan to make use of it. Stage III is recommended for racing only.

ITEM	NO.	APPLICATIONS	PRICE
Stage I with 570cc kit & K-H DS cam		Honda CB500/550	$219.95
Stage I with 590cc kit & K-H DS cam		Honda CB500/550	286.95
Stage I with 601cc kit & K-H DS cam		Honda CB500/550	286.95
Stage II with 570cc kit, K-H DS cam & springs		Honda CB500/550	379.95
Stage II with 590cc kit, K-H DS cam & springs	EP-1	Honda CB500/550	379.95
Stage II with 601cc kit, K-H DS cam & springs	EP-1	Honda CB500/550	379.95
Stage III with 570cc kit, K-H DE cam & springs		Honda CB500/550	379.95
Stage III with 590cc kit, K-H DE cam & springs		Honda CB500/550	379.95
Stage III with 601cc kit, K-H DE cam & springs		Honda CB500/550	379.95
Stage I with 717cc kit & K-H 65D cam		Kawasaki KZ650	409.95
Stage II with 717cc kit, K-H 65D cam & springs	EP-2	Kawasaki KZ650	514.95
Stage III with 717cc kit, K-H L-1 cam & springs		Kawasaki KZ650	514.95
Stage I with 811cc kit & SS-1 cam	EP-3	Honda CB750 (SOHC) all except F-2	269.95
Stage I with 836cc kit & SS-1 cam		Honda CB750 (SOHC) all except F-2	269.95
Stage I with 836cc kit & SS-1 cam		Honda CB750 (SOHC) F-2 models	279.95
Stage I with 811cc kit & K-H D cam		Honda CB750 (SOHC) all except F-2	269.95
Stage I with 836cc kit & K-H D cam		Honda CB750 (SOHC) all except F-2	269.95
Stage I with 836cc kit & K-H D cam		Honda CB750 (SOHC) F-2 models	279.95
Stage II 811 w/cam, springs & forged steel rods	EP-4	Honda CB750 (SOHC)	559.95
Stage II 836 w/cam, springs & forged steel rods		Honda CB750 (SOHC)	569.95
Stage III 811 w/cam, springs & forged steel rods		Honda CB750 (SOHC)	559.95
Stage III 836 w/cam, springs & forged steel rods		Honda CB750 (SOHC)	569.95
Stage I with 1015 kit & K-H KD cams	EP-5	Kawasaki KZ900/1000	409.95
Stage I with 1075 kit & K-H KD cams		Kawasaki KZ900/1000	409.95
Stage II 1015 w/cams & racing valve springs		Kawasaki KZ900/1000	504.95
Stage II 1075 w/cams & racing valve springs		Kawasaki KZ900/1000	504.95

Engine packages

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Action Fours (cont.)	Stage III 1015 w/cams, springs & followers		Kawasaki KZ900/1000	$599.95
	Stage III 1075 w/cams, springs & followers		Kawasaki KZ900/1000	599.95
Competition Engineering Save a few dollars by purchasing several components together while getting matched performance at the same time. These kits take the guess work out of which of their components to combine. Choose the level of performance you desire with their Complete or Ultimate engine kits.	Complete engine kit with big bore kit, cams, valve springs & titanium retainers.	EP-6 &EP-7	Kawasaki KZ900/1000 & Suzuki GS1000	689.00 to 769.00
	Ultimate engine kits with 1176 or 1200cc big bore kits, DFI grind cams, valve springs, ported head with 1mm oversize intake valves, smooth bore carbs & Daytona exhaust system		Kawasaki KZ900/1000 & Suzuki GS1000	1705.00 to 1780.00
R.B. Racing Matched performance with big bore kits, new billet camshafts and racing valve spring sets.	836cc big bore kit with billet cam and springs		Honda CB750 (SOHC)	$495.00
	1000cc kit with new billet cam and springs			495.00
	1075 & 1200cc engine packages		Kawasaki KZ900/1000	585.00
	1085 & 1176 cc engine packages		Suzuki GS1000	585.00
R.C. Engineering Suggested packages that have proven to be practical combinations to R.C. Proven through 10 years of dyno, drag strip and highway use.	Stage I 836cc engine with micro-polished, lightweight crank, lightweight alternator, high-performance rods or super rods, heavy-duty cam chain, clutch kit, valve spring kit and racing cam.		Honda CB750 (SOHC)	1362.86
	Stage II 900cc engine kit includes the preceding components plus a 900cc big bore kit, chrome moly cylinder studs, rocker stand supports, adjustable cam sprocket, smooth bore carbs, heavy-duty kick starter shaft, ported head and ignition system.		Honda CB750 (SOHC)	2986.93
	Stage III 1000cc Cobra package in-		Honda CB750 (SOHC)	$3658.92

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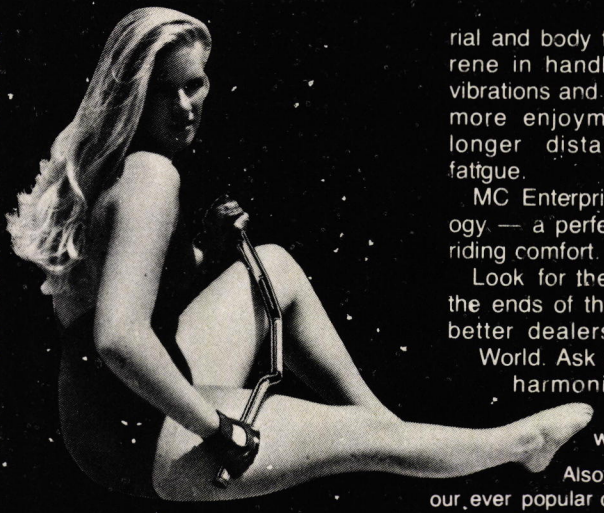

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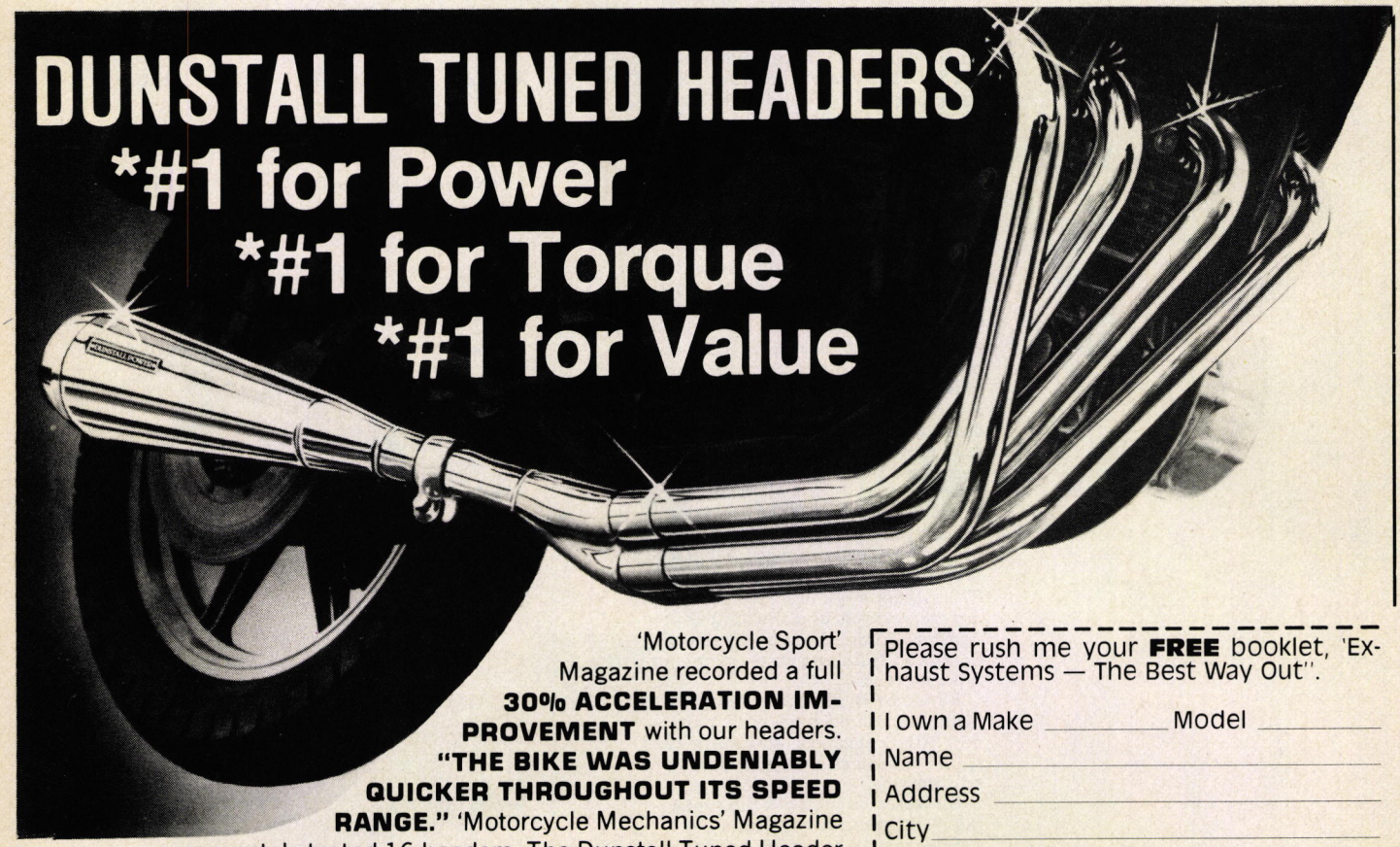
Engine packages

MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
R.C. Engineering (cont.)	cludes all of the components listed in the 900cc kit plus ported and polished head, stainless steel valves and Clubfoot swingarm and wheelie bar for serious drag racing only. Stage I, II & III kits for large bore hyperbikes featuring increasing levels of performance through R.C.'s many high-performance products including R.C. turbo charging systems. Smaller displacement packages are more suited for street applications.		Kawasaki KZ900/1000, Suzuki GS750/1000	**$1593.49 to 4088.47**
Wiseco Piston Selected combinations of components which are intended to produce good reliability with a significant increase in overall performance. All kits feature Wiseco's forged piston sets and new billet camshafts.	836 Super Street Kit includes 10.25:1 comp. 836cc forged pistons, wristpins, cylinder studs, a .350-inch lift camshaft and heavy-duty valve springs.	EP-8	Honda CB750 K	**$370.30**
	720 Super Street Kit includes 10.25:1 forged 720cc big bore kit, a .350-inch lift camshafts, heavy-duty valve springs and all gaskets necessary for reassembly.	EP-9	Kawasaki KZ650	**408.95**
	1000 Super Street kit includes all of the preceeding KZ650 components but with a 1015 or 1075cc forged big bore piston kit.	EP-10	Kawasaki KZ900/1000	**413.35**
	GS750 Super Street kit includes 10.25:1 comp. forged 870cc big bore kit, new billet camshafts, heavy-duty valve springs and all necessary reassembly parts.	EP-11	Suzuki GS750	**413.35**
	1100 Super Street kit includes 10.25:1 comp. forged big bore piston kit, a .390-inch lift billet camshaft set, heavy-duty valve springs and all necessary reassembly parts.	EP-11	Suzuki GS100	**413.35**



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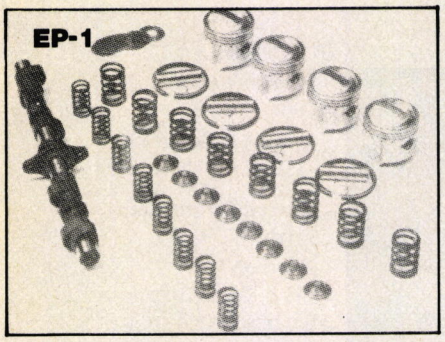
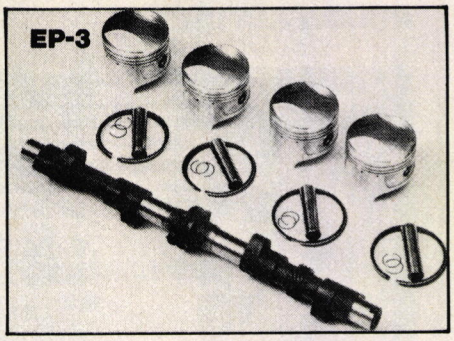
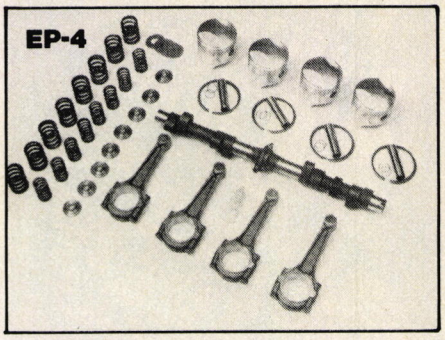
Engine packages

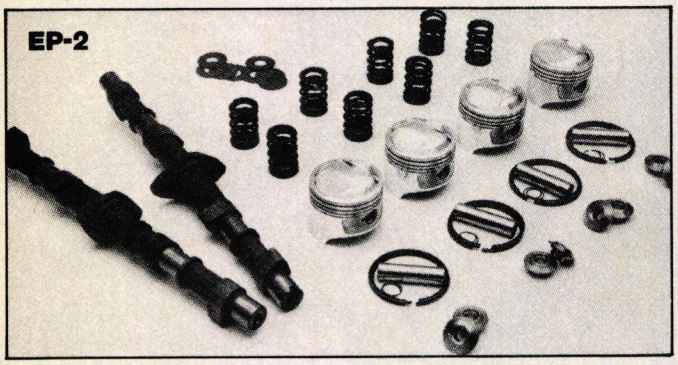
MANUFACTURER	ITEM	NO.	APPLICATIONS	PRICE
Yoshimura Research & Development Proven collections of components as used in Yoshimura's race winning road racing machinery. Performance kits are available in Stages I, II, III & IV depending on the degree of performance increase you are looking for.	Stage I packages include Road Special cams, big bore kit, heavy-duty valve springs, 29mm Mikuni smooth bore carbs, boring and assembly labor.	EP-12	Most popular mid-to large bore hyperbikes.	**$1212.95**
	Stage II packages include all Stage I components plus Pop's head porting and the substitution of the Road Special camshafts with the Bonneville race cams.	EP-13	Most popular mid-to large bore hyperbikes	**1572.95**
	Stage III packages include all preceding package components plus over-sized valves.	EP-13	Most popular mid-to large bore hyperbikes	**1820.95**
	Stage IV packages are their Superbike race engines designed specifically for serious road racing endeavors.			**Available on request**
M & M Racing Complete engine kits compiled from M&M's proven combinations of performance products. These packages are designed to meet the demands of both the budget minded and those with big bucks—from sleeper to screamer.	836cc forged piston kit, with billet cam, racing valve springs, heavy-duty clutch springs, lightweight alternator, valve job and complete assembly.		Honda CB750 (DOHC)	**642.50**
	836cc Sleeper with components listed above plus high-performance rods, heavy-duty cam chain and complete balance and blueprinting of engine and transmission.		Honda CB750 (DOHC)	**883.50**
	900cc kit includes all of the preceding components plus heavy-duty cylinder studs, new, larger cylinder sleeves with forged pistons and necessary machine work and thorough inspection of all components.		Honda CB750 (DOHC)	**1095.50**
	1000cc Killer kit includes all of the preceding components plus 1000cc forged pistons with new cylinders, porting and polishing head, enlarging combustion chambers and undercutting all transmission gears.		Honda CB750 (DOHC)	**1240.55**
	1013 Sleeper kit includes complete top end disassembly and inspection, 1013cc forged piston kit, bore and hone job, valve springs, new billet camshafts, reassembly to strict specifications and all tuning adjustments.		Kawasaki KZ900	**$593.50**
	1075 & 1103 kits include preceding components plus cylinder head porting and polishing, slotted cam sprockets, heavy-duty cam chain and welded crankshaft.		Kawasaki KZ900/1000	**950.00**
	1132 Pro Motor includes preceding M & M components in 1075/1103cc package plus 1132 forged pistons, racing wrist pins, adjustable cam sprockets, deep sump oil pan and modified oil pump, Pro billet cams, stainless steel valves and undercutting all transmission gears.		Kawasaki KZ900/1000	**1731.50**
	1200 He-man Motor kit includes all preceding Pro Motor components plus a full 1200cc set of forged pistons and all the necessary heavy-duty hardware to do some serious drag racing. Recommended for experienced riders only.		Kawasaki KZ900/1000	**1884.44**
	800cc Motor kits include forged piston kit, bore and hone job, race valve spring kit, new billet camshafts, adjustable cam sprockets, valve job, inspection, reassembly and tuning.		Suzuki GS750	**660.00**
	870cc Sleeper kit includes preceding components plus the options of porting and polishing head, smooth bores and installing an electronic ignition system.		Suzuki GS750	**670.00**
	1085 Motor kit includes forged piston kit, racing valve spring kit, new billet camshafts, adjustable cam sprockets and all necessary tuning adjustments.		Suzuki GS1000	**670.00**
	1150 Terror kit includes the preceding M&M components plus a big 1150cc forged piston kit, heavy-duty cylinder studs and cam chain, welded crankshaft, undercutting all transmission gears and stainless steel valves.		Suzuki GS1000	**1625.00**

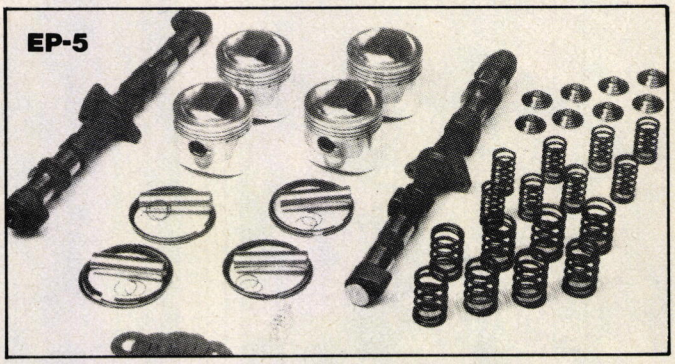
Engine packages

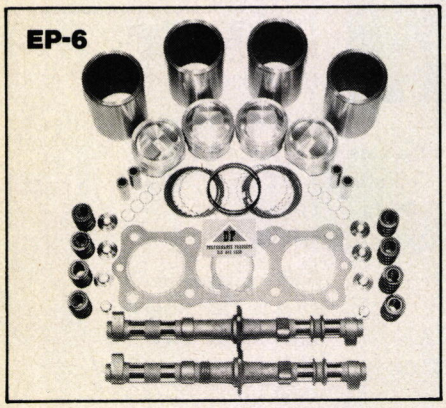


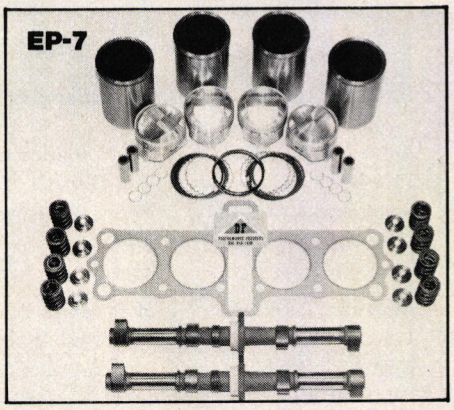


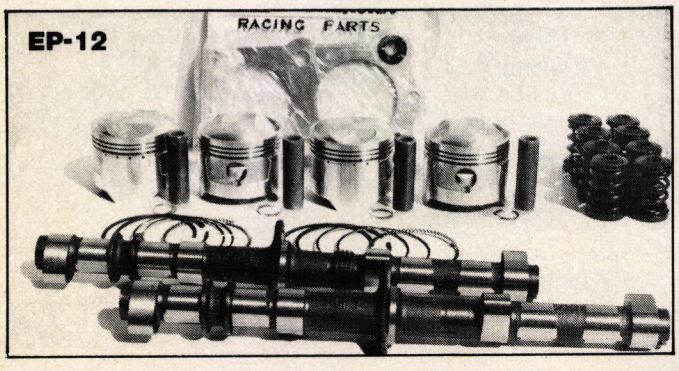


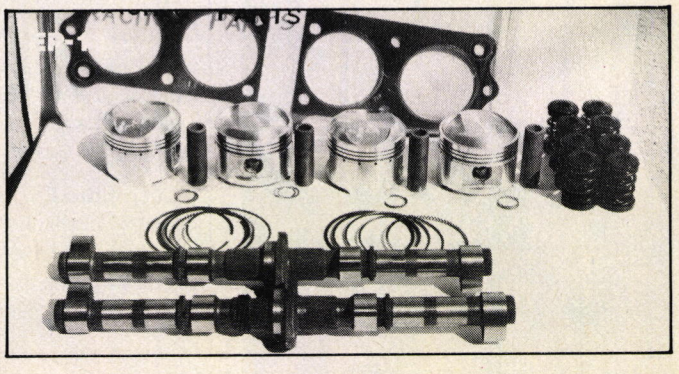












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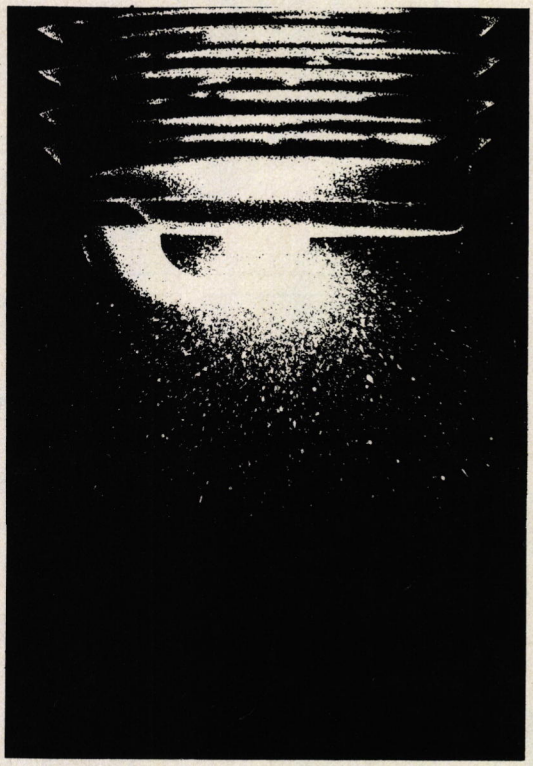

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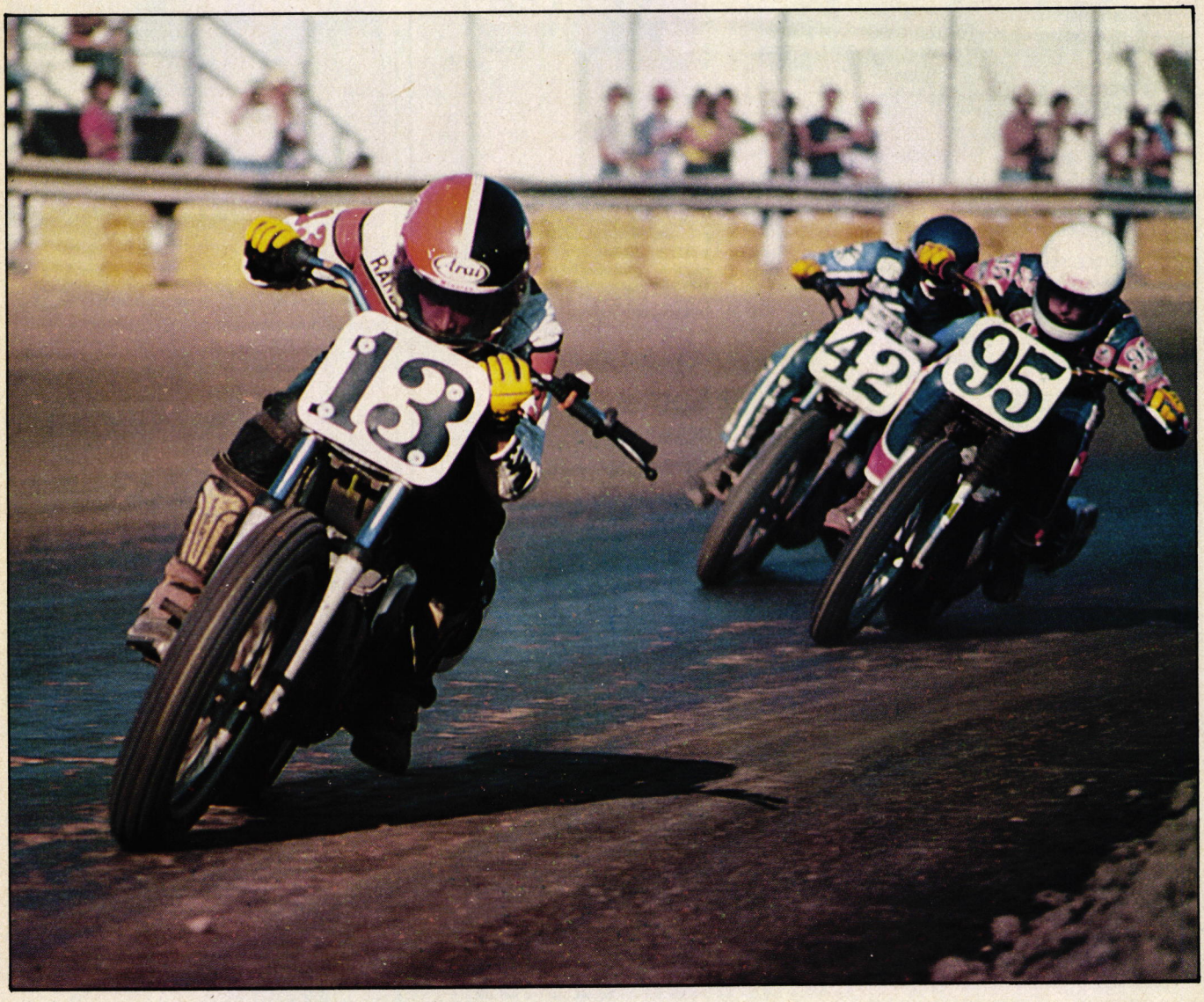
EDITED BY DAIN GINGERELLI

Winners & Losers 1980

Randy Goss points out that he's a winner.



PHOTOGRAPHY © 1981 PATRICK BEHAR

• If megavolts of excitement didn't charge the Ascot Raceway last October, it wasn't for lack of tradition. Ascot's Half-Mile is the final race on the AMA Grand National calendar, and four out of the past five years the event has determined the national championship. Moreover, heading into the 1980 finale the scene-set was perfect: Randy Goss, Harley-Davidson's newly-acquired factory rider, led privateer Hank Scott by only four points. It seemed that another breathtaking fight-to-the-checkers was imminent.

That it didn't turn out that way was, in retrospect, only fitting, for the previous nine months of the season were hardly filled with high drama. Nobody can pinpoint the reason, but the 1980 championships were indeed lackluster for almost all concerned.

Maybe it was because Steve Eklund, the 1979 champ, was never in the hunt and was sidelined consistently with mechanicals. Or maybe it was Jay Springsteen, the 1976-77-78 champ who was also never in the hunt, being sidelined mysteriously with physicals.

Oh, there were a few moments, like the brief return of Kenny Roberts at the Astrodome TT, the first race of the year. Roberts won at Hous-

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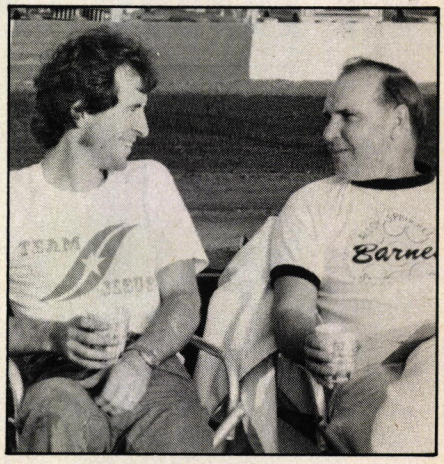


Goss and Scott sliding at Ascot

When a half-mile is a short circuit.

ton, and tied Bart Markel's AMA career record of 28 wins in the process. But then King Kenny retired to Europe for his perennial roadracing coronation, and the Grand National tour was minus yet another star.

And there was a mid-summer, topsy-turvy point duel between Scott and Goss. Hank seemed to have the edge, mainly on experience, but just when he appeared headed for the championship, his sponsor, Patrick Racing, abruptly pulled out of the Winston Pro Series. Scott, who is a born-again Christian, suddenly found himself a pariah in the pits. That he came back is testimony to his fortitude. With the help of Jerry Branch, Scott assembled another set of bikes and returned to the coast-to-coast Winston Pro struggle.

But even with Scott's misfortune and comeback—and a determined march up the point standings by Goss—an electric charge still didn't zap the Ascot crowd as the season ended. Perhaps it was the second-row starting positions the point-leading pair shared in the main event, or the lack of any other title contenders. Whatever, the tangle in the main was anticlimactic: Scott finished third and Goss was fifth, closing the gap by only three points. Randy Goss thus became the 1980 Grand National champion.

By winning the No. 1 plate, Goss also becomes *CG*'s flattrack Winner. But if you listen to Hank Scott, the impression is that he won, too. "I gave it my best, and I want to thank God for making it all come true," he said.

—Dain Gingerelli

WINNERS & LOSERS 1980:

Four-Stroke Roadracers Return

While the two-strokes fade into a blue haze.

• A Formula 1 bike was supposed to win Daytona last year. At least according to four-stroke proponents such as Wes Cooley. Cooley was one of the loudest—and perhaps the most prophetic—voices supporting valves and camshafts. His credentials spoke for him: He was the 1979 Superbike champ, and his Yoshimura Suzuki—possibly the fastest and best-handling four-stroke—seemed capable of breaking the TZ domination of Daytona's 31-degree banks.

But Cooley and his four-stroke pals had to wait. Even considering Ron Pierce's calculated fifth-place finish on the Honda F1 in the 200-miler, the 1000cc four-strokes were no match for the buzzing TZs of Freddie Spencer and race-winner Patrick Pons.

Cooley's boast finally came true at Elkhart Lake in June. It was the first AMA roadrace win by a four-stroke since Cal Rayborn clattered his Harley-Davidson vee-twin across Laguna Seca's uphill finish line in the summer of 1972.

Because Cooley fulfilled the four-strokers' prophecy, Superbikes and F1s alike list as 1980's roadrace winners. Cooley, in particular, should be rewarded just for sticking out the Superbike boom; he saddled one of Yoshimura's street-converted roadracers in 1975, and has been with the organization ever since.

Ironically, roadracing's loser for 1980 is the AMA National roadrace champ, Rich Schlachter. The personable New Englander is of the Superbike generation, like Cooley, and has persevered through the hard times that generally plague the pits of privateers. Schlachter won his second straight AMA title, but both have come at a time when two-stroke bikes lost not only a competitive edge, but fan support to the new-wave F1s and Superbikes.

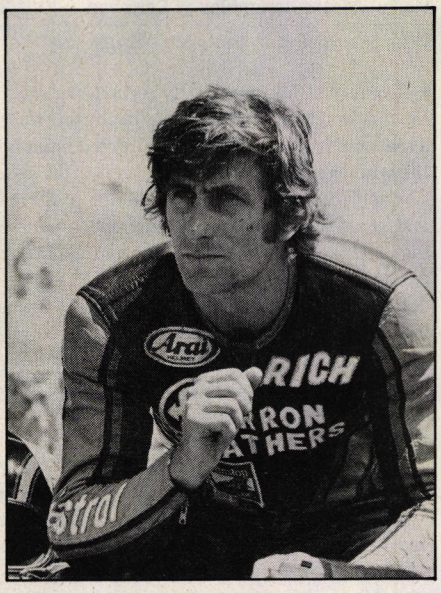
Schlachter decided to turn in his carpenter's tools at the beginning of 1980, thus becoming a full-time professional roadracer. He was hungry to retain his title, but also wanted desperately to win his first AMA roadrace national; although he was the 1979 champ, he backed into the title without ever crossing a finish line first. And like Cooley, his first win of 1980 came in the month of June, when he won in his own backyard at Loudon.

Schlachter will undoubtedly return this year on his Microlon-sponsored TZ750. But you have to wonder how long he will remain the relatively unknown champ of roadracing. You can bet that with the popularity of Superbike racing, one of the factories involved will find a vacant saddle for him. And when that happens, watch the AMA roadrace champ become a recognizable winner. —*Dain Gingerelli*

Continued

Wes Cooley and Superbikes on the rise

Four-strokes make their return.



Rich Schlachter—the forgotten champ

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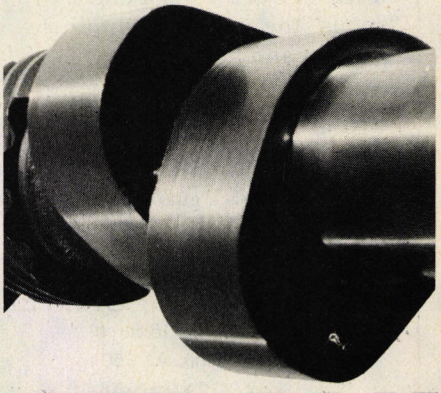

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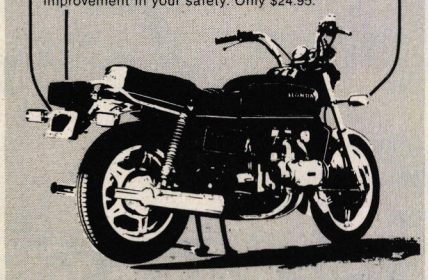

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WINNERS & LOSERS 1980

Marty Moates Finds Instant Stardom

Brad Lackey plays the bridesmaid again.

Marty Moates scrambles at Carlsbad

Where winning is the only thing.

• Gerrit Wolsink practically owned Carlsbad. Having won five USGPs, it was beginning to be a seasonal tradition to see the Dutch dentist on the winner's podium every June. But this year he wasn't on a Suzuki—he was Maico-mounted and stood a slim chance against the Japanese factory bikes. The stage was set in 1980 for an American to win the USGP.

Everybody picked Brad Lackey. He was locked in a struggle with Honda's Andre Malherbe for the 500cc championship, and there was no disputing Lackey's Mean Green Machine was worthy of conquering Carlsbad's tough adobe traction.

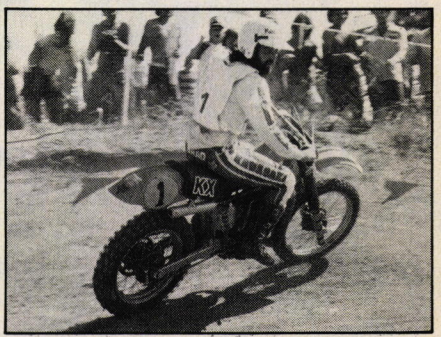
But Lackey didn't win the USGP. Marty Moates did, and in the process, sustained a wave of nationalism that swept the country last year, beginning with the U.S. hockey team's dominance at the Lake Placid Winter Olympics. Moates' victory made him more than just a single race winner, it ranks him as *the* motocross winner for 1980, because it marked the first time an American has won this prestigious and rich event.

Brad Lackey clocks out the old year as the berm-busting loser. Even though he finished second in the championship standings—for the third year in a row—you can't help but wonder how things would have turned out if he had been more cautious at the Carlsbad GP. For, you see, Lackey was leading the second moto in front of Moates when he crashed, and thus earned no points. As it turned out, Malherbe's Honda refused to leave the line in the same moto, and coupled with Lackey's almost certain *second* place finish, the point spread at the end of the season would have favored the American rider.

But Lackey toppled into a catch-fence toward the end of the second moto at Carlsbad, and forfeited any freebee points Malherbe's sick engine might have given him. It's understandable that Lackey and every American rider on the Carlsbad course that day wanted to win in front of the home crowd. But Lackey had taken a professional approach to winning the overall *world championship,* and it was foolish for him to crave the USGP win as well. For his maneuver in that second moto, he gets the loser's trophy.

And even though Moates didn't win a race the rest of the year, and ended the season in a cast after yet another knee operation, he fills the winner's slot. After all, how many other Americans have won the 500cc USGP?

—Dain Gingerelli



Brad Lackey after the storm

Taking home a crash and no points.

Pit Bits

PHOTOGRAPHY © 1980 JIM GIANATSIS

Chuck Sun's first flying lesson

He grew wings during the off-season.

• In case you're wondering what 500cc motocross national champs do during the off-season, look to the sky. There you'll see Chuck **Sun** taking **flying lessons** in his new single-engine Bonanza. And if you look west, you'll see the Sun setting into the ocean aboard his 38-foot Erickson sailboat. Busting berms does have its rewards.

• Bruce **Penhall** didn't do so badly this past fall, either. The personable young **speedway** racer from Southern California had a successful season in England, but was disappointed with his fifth-place in the World Finals. So he returned to the Orange County Fairgrounds—where his career in roundy-round racing began—for a stab at the U.S. Nationals. He made a clean sweep, winning all five heats, and earned his first-ever **U.S. title.**

• While Penhall was busy going in circles, slingshot-hotshot Bo **O'Brochta** continued to ignite the quarter-mile crowds. This time he powered his Terminal Van Lines-sponsored Kawasaki through Ontario Motor Speedway's lights at **7.08-seconds** during the Winston Finals.

• According to Ron Teson, tuner and builder of Jim **Bernard's Yamaha fueler**, dragrace ETs have dropped like comets from space for one simple reason: "The fast times are on account of everybody burning more fuel—that's all." Teson claims it's not uncommon to burn a gallon and a half of the super-stuff on a pass. That means almost ten gallons flow through the cylinders during a full elimination bracket. Teson expects to tip the can even more to reach dragracing's **200 mph** Shangri-la. But at a cost of about $20 a gallon, it don't come cheap.

• Danny **LaPorte** don't come cheap, either. **Honda** reportedly swooned him from Suzuki for a two-year contract, to include the 500 nationals with occasional forays in Europe. LaPorte's change of jerseys doesn't come as a shock, though, since he and Honda's team leader, Roger **DeCoster** were roommates back in the good ol' Trans-AMA days when Mr. D wore a **Big S** on his shirt. •

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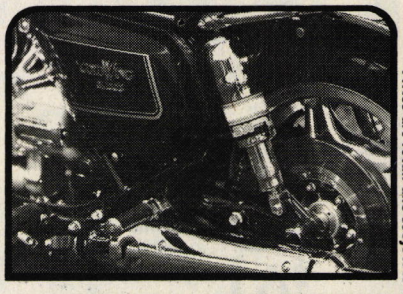

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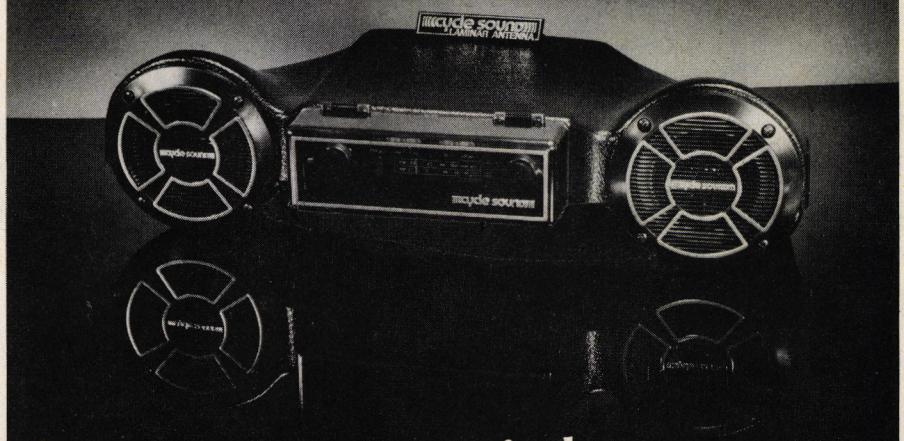

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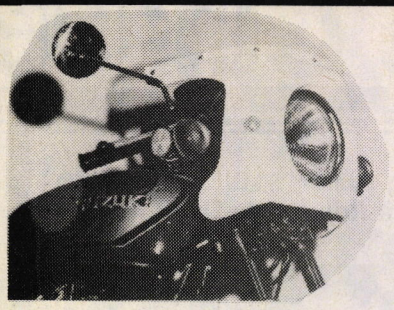

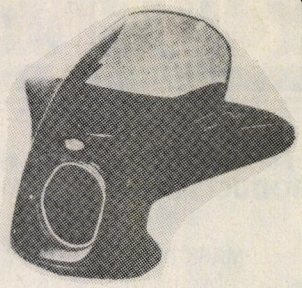

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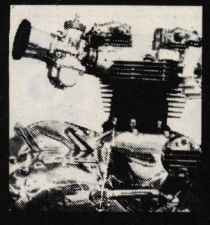

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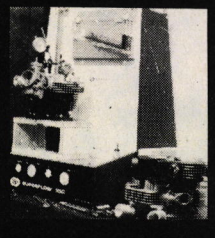

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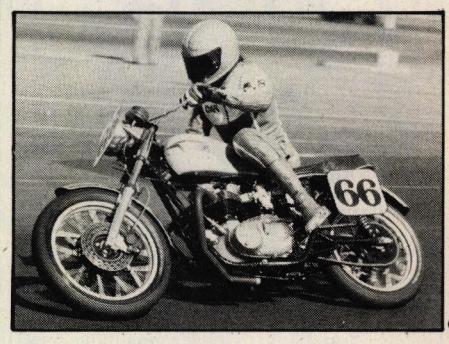

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• Racing is meant to be fun. So says John Gallivan of TT Motors in Berkeley, California. Gallivan has another underlying theme to his racing: Race a bike that's different from the rest of the field. That's why he has rider/mechanic Dan Batcheller aboard a Triumph twin in the four-cylinder-dominated superstreet class at AFM roadraces in Northern California.

"The Triumph," explains Gallivan, "is able to keep up with the Open-class superstreet bikes and actually make up time on them in the twisty back sections because it handles so well." Batcheller and Gallivan both feel the twin's narrow design and light weight are primary factors behind its agility.

But the bike wasn't a pavement gripper from the beginning. It took a season of bent parts and scuffed leathers to learn how to make the 750 twin handle well. Modifications included blueprinting the stock fork and lengthening the swingarm for high-speed stability. The greatest improvement in handling, feels Batcheller, came when the alloy rims were slipped into a pair of Goodyear slicks.

And while the chassis got the Super Glue treatment, the engine was sent to muscle-building school. Sifton 391 high-lift cams insure there's plenty of breathing time to fill the Routt 9.5:1 piston-filled jugs. Oddly, high-dome pistons aren't used because they interfere with gas/air flow, one of the lessons learned from Kenny Augustine of Kinetic Analysis after the '78 season. Gallivan was enthusiastic after his brief Augustine seminar: "We learned more about porting, piston clearances and machining than we had in the previous two years on our own."

Along with the abundance of horsepower, TT Motors found itself swamped with a gathering of broken crankshafts. This is a universal problem for these Fifties-dated cranks, not because they're poorly designed, but because they were intended for engines producing less than 50 hp. Gallivan called Triumph specialist C.R. Axtell for some timely advice, which produced good news and bad news. "The

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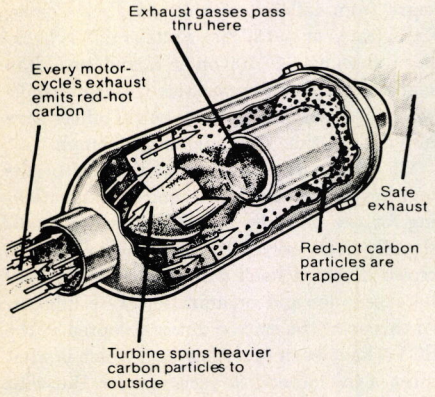
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John Gallivan and Dan Batcheller

Pre-race shade tree relaxation.

good news," said Axtell, "is that now you're putting about 80 horsepower to the rear wheel." And the bad news, C.R.? "You're gonna keep on breaking cranks."

But TT Motors hasn't given up. In fact, the Bay Area group wants to punch the 750cc cylinders to 900cc in hopes of being competitive in AMA superbike racing. The goal is to be on the starting grid for Daytona. "If we end up blowing a couple of motors, we're just gonna go up into the stands and watch. None of us have ever been to Daytona, and we're not going to ruin the trip just so we can race a motorcycle."

After all, nobody said you have to win to have fun. Or for that matter, make the field.

—*Jerry Smith*

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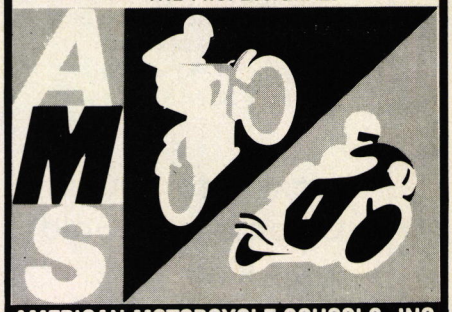

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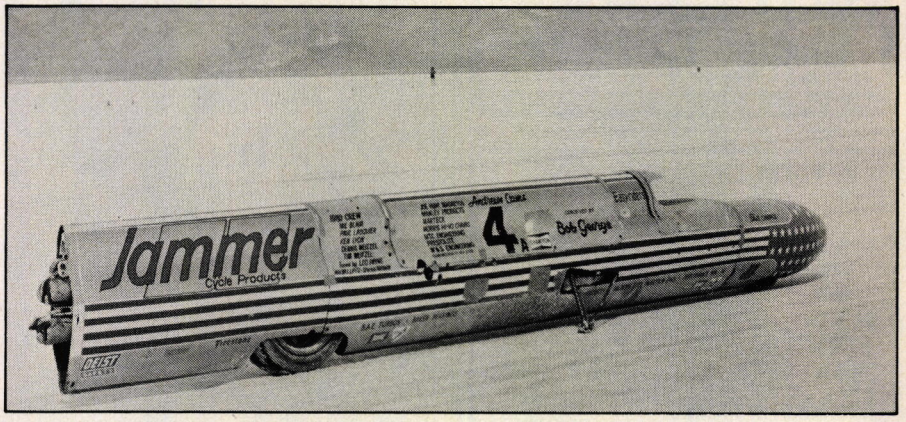
SALT FLATS:

Bonneville Slosh Week

For the most part, the water was higher than the speeds.



• Horsepower and streamlining are necessary ingredients for Bonneville land speed records. But there's another factor racers have to reckon with—weather. Generally it's the crosswinds spilling out from the nearby mountain passes that hamper top speed runs, but this year it was rain.

Summer rainstorms left an unusual amount of water on the Flats, but most of it was on the western stretch of salt, away from the speed lane. Southern California Timing Association officials didn't consider it a menace to the runs, and so not much concern was given to it. But the winds that can suddenly blow, did just that. Combined with another rainstorm Saturday night and early Sunday morning of Speed Week, the two-lane speed path on the eastern portion of the Flats was suddenly under six inches of water. Speed Week 1980 looked in question, but one SCTA official was optimistic and said: "We'll run—if the wind blows back to the West and takes the water with it."

Old time Bonnevillers spoke confidently about the time the winds did exactly that in 1967. The SCTA members were willing to gamble this year, too, and let their money ride throughout the week in hopes of better salt conditions. Meanwhile, the racers placed their bets on the blackjack and craps tables of nearby Wendover casinos and filled the motel parking lots with benchracing tales that were washed down with Coors beer. Sunday and Monday were slow days for people used to going over 200 mph.

By Monday, the SCTA board located a relatively dry stretch of salt on the western portion of the Flats, and Speed Week 1980 got rolling that afternoon; a day and a half late, but the racers were ready nonetheless.

The wet salt hampered traction, especially for the heavier bikes, which not surprisingly boast more horsepower, too. And so on the sidelines stayed motorcycle LSR record-holder Don Vesco, whose double-engine KZ1300 streamliner was still in the incubator at his San Diego shop, stripped of its shell for some last-minute alterations anyway. Vesco planned to return later in the fall for his 400-mph attempt—weather permitting. Dave Campos, on the other hand, had his Jammer-sponsored Harley-Davidson-powered streamliner ready to roll. He sloshed through the mile mark at a disappointingly slow 205.362 mph.

Perhaps the biggest star of Speed Week was Dave Matson and his ancient Vincent Black Shadow. The pair set a gas-class record of 178.246 mph. Then Matson mixed a volatile cocktail in the tank, running 50 percent nitro for another record—and top speed of the meet—at 195.016 mph. Matson attributes the records to more engine displacement and a new swingarm that improved handling. Other than that, he doesn't say much about the bike, keeping to the racer's code that records are set with horsepower and verbal silence.

Despite the poor conditions, 13 records were set. Scott Spittler was another racer rewriting a class record, upping the 1300cc production mark from 152.630 mph set by Rick Coates' CBX last year to 157.806. Spittler did a check-out run on his GS1100 on an abandoned Utah highway and knew he was ready for Bonneville when an observing highway patrol officer gave him a radar-time slip indicating 136 mph.

Of greater legal concern to the rest of the motorcycle racers is the second-year sanctioning for the bikes by the SCTA, which traditionally deals only with cars. The motorcycle crowd divorced itself from the AMA in 1979 because rules and organization were unclear. At this point the matron duties accepted by the SCTA have been fairly low-key, which is what most of the motorcycle racers prefer. But with two former motorcycle racers on the SCTA board, optimism has been running high for a permanent home with the automobile governing body. And considering the poor condition of the salt, it was this new wave of optimism that was higher than any speeds set for Speed Week 1980. —*Dorde Woodruff*

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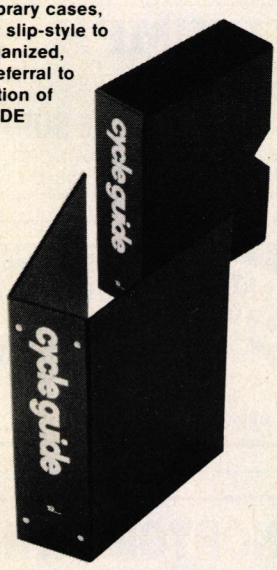

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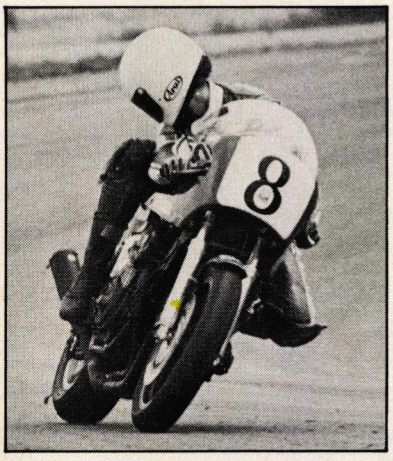

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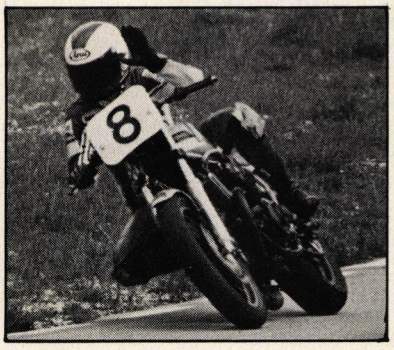

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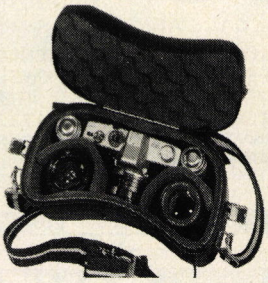

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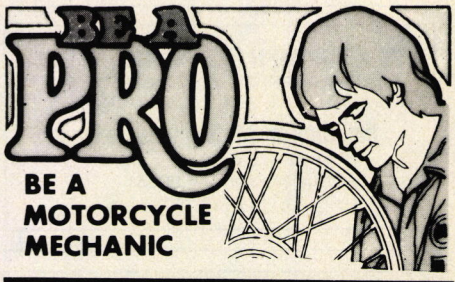

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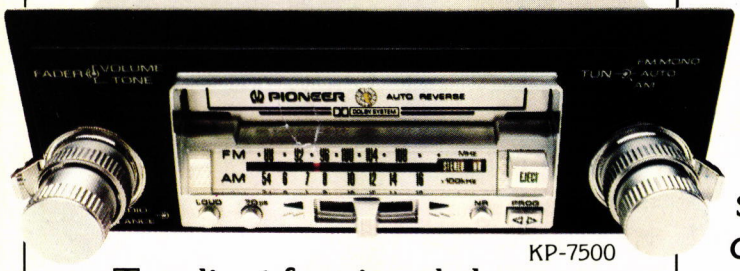

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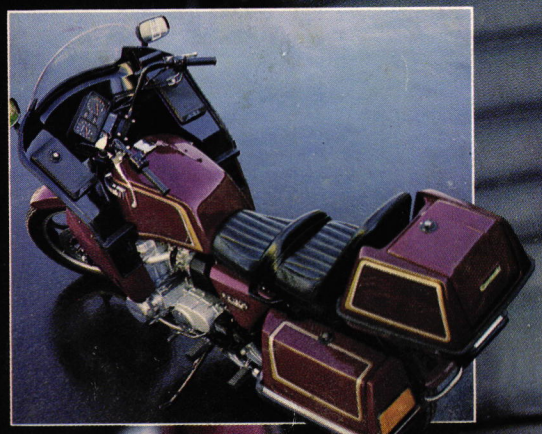

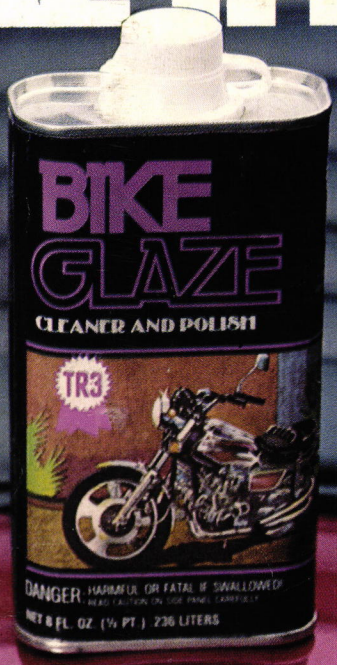

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